UNIVERSITY OF NORTH TEXAS CENTENNIAL 1890-1990

BENCHMARKS

The University of North Texas Computing Center Newsletter

VOLUME 11 NUMBER 8
November/December 1990

Focus on Statistical Packages

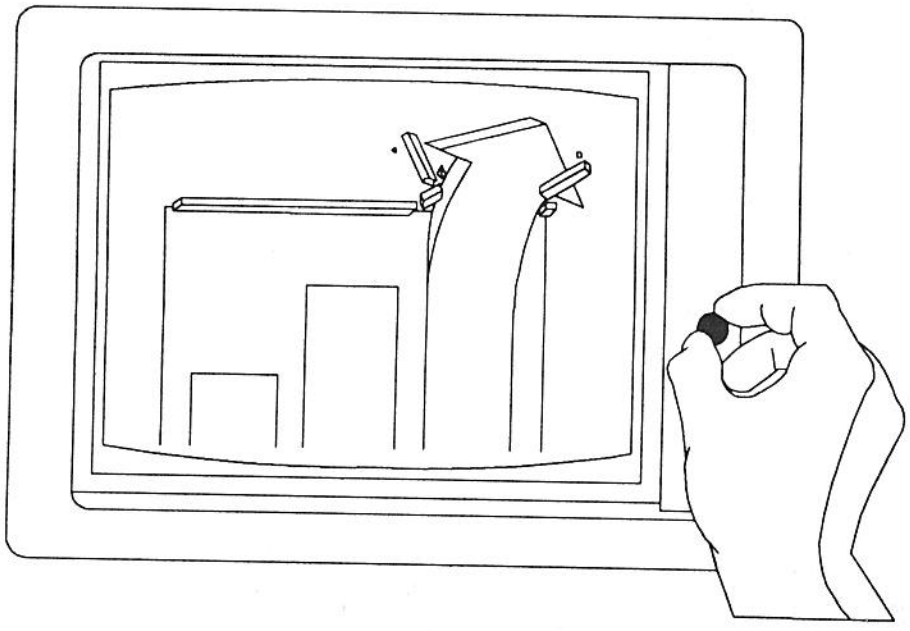
By Claudia Lynch, *Benchmarks* Editor (BITNET: AS04@UNTVM1)

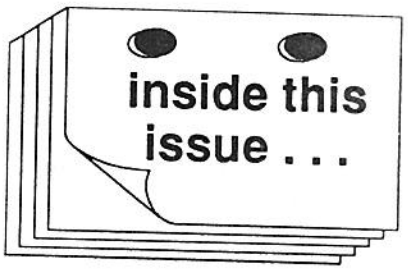
This is the second time the theme of *statistical packages* has been used for an issue of *Benchmarks*. The first time was back in the May/June 1989 issue. This theme was chosen and repeated because we recognize that most serious researchers, regardless of their discipline, will — at one time or another — need to use some type of statistical package.

While this issue contains a great deal of information on the various statistical packages available at UNT, it is impossible to publish everything that would be of interest to someone using these packages. The documents listed on page 3 are available — free of charge — from the Computing Center reception area (ISB 119). They contain information that may not be available in this current issue of *Benchmarks*.

Benchmarks Articles

The following is a list of previously published *Benchmarks* articles dealing with statistical topics. Back issues of *Benchmarks* are available, upon request, from the Computing Center reception area (ISB 119).





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SERVICES AVAILABLE TO USERS OF THE UNT COMPUTING FACILITIES

The UNT Computing Center is located in the Information Sciences Building (ISB), Room 119. Phone Numbers:

Computing Center:	(817) 565-2324
Help Desk:	(817) 565-4050
Micro Support:	(817) 565-2316, 565-2319
Graphics Lab:	(817) 565-3479
ISB I/O Area:	(817) 565-3890
BA I/O Area:	(817) 565-2350

All personnel listed below can be contacted either by calling the Computing Center or by sending them electronic mail on MUSIC/SP (ID-codes follow each name. All IDs are on BITNET node UNTMUSIC).

Benchmarks - Claudia Lynch (AS04)

Information & ID-Codes; Disk Space Problems - Theresa Russell

Statistical/Research Support - George Morrow (AS01), Panu Sittiwong (AC09), Phanit Laosirirat (AC44)

Academic ADABAS/COM-PLETE - Cathy Hardy (AC55)

CRSP & COMPUSTAT Problems - Panu Sittiwong (AC09), Phanit Laosirirat (AC44)

Student Programming Problems - CSCI Dept., GAB Room 550; BCIS Dept., BA Room 152

Problems with JCL, Passwords, or Operating Systems; or Communication/Terminal Problems - Help Desk

Data Entry; Test Scoring & Analysis - Betty Grise

Administrative Applications - Coy Hoggard

Printout Retrieval - ISB or BA I/O Operators

DIALING-UP UNT COMPUTERS OVER THE TELEPHONE

Phone numbers for the Local Area Network (LAN) are:

300 - 2400 BAUD:	(817) 565-3300
300/1200 BAUD	(817) 565-3499
300 - 9600 BAUD:	(817) 565-3461
300 - 9600 BAUD:	D/FW METRO 429-6006, 429-9314

Area code 214 must dial 817 before the METRO #.

The numbers that accomodate multiple baud rates have an autobaud feature that requires you, once connection with the remote modem is made, to hit the <RETURN> key repeatedly so that the receiving modem can determine the appropriate baud rate. When you have established a communications link, the # prompt will appear on your screen and you can enter one of following CALL commands to connect with the computer of your choice.

CALL 8040	connects with the HDS/8083 (supports line editing or PCWS). Operating environments available are: MUSIC/SP.
CALL 3270	connects with the HDS/8083 through a 3270 protocol converter (supports full-screen editing). Operating environments are: MUSIC/SP, VM/CMS, ADABAS/COM-PLETE
CALL DEC	connects with the VAXcluster (VMS)
CALL 780	connects with the Sequent (Unix)
CALL 3000	connects with the Libraries' HP-3000 (Bibliographic database).

Communications Settings

LAN addresses	Data Bits	Parity	Stop Bits
DEC, 3000	8	N	1
8040, 3270, 780, 6800	7	E	1

HOURS FOR UNIVERSITY OF NORTH TEXAS COMPUTER ACCESS AREAS : Fall 1990*

Location	Days	Times
Computing Center RJE	Sunday Monday-Saturday	Noon-Midnight 7 a.m. Mon.-Midnight Sat. (Open 24 hours/day)
ISB 110 Terminal Area	Sunday Monday-Thursday Friday Saturday	1p.m. - Midnight 8:00 a.m.- Midnight 8:00 a.m.- 9 p.m. 9 a.m.- 9 p.m.
College of Business	Sunday Monday-Thursday Friday, Saturday	Noon-11:45 p.m. 8:15 a.m.-11:45 p.m. 8:15 a.m.-7:45 p.m.
GAB 550C	Sunday Monday-Thursday Friday Saturday	4 p.m. - Midnight 8 a.m.- Midnight 8 a.m.-5 p.m. 2 - 8 p.m.
Graphics Lab	Sunday Monday-Thursday Friday Saturday	1 p.m.- Midnight 8 a.m.- Midnight 9 a.m.-9 p.m. 9 a.m.-9 p.m.
Willis Library	Sunday Monday-Thursday Friday Saturday	1 p.m.- Midnight 7:30 a.m.- Midnight 7:30 a.m.-9 p.m. 9 a.m.-9 p.m.

*Hours may vary. Check MUSIC/VAX News and/or posted schedules for exceptions.

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- "Statistical Software at UNT," *Benchmarks*, Volume 11, Number 6, September 1990 (pp. 24-26).
- "Machine Readable Data Available at UNT," *Benchmarks*, Volume 11, Number 6, September 1990 (pp. 26-27).
- "Preparing Correlation or Covariance Matrices for EQS or LISREL," *Benchmarks*, Volume 11, Number 2, March 1990 (pp. 11-12).
- "Circumventing a SAS GRAPH Quirk," *Benchmarks*, Volume 10 Number 5, May/June 1989 (p. 6).
- "Using the SPSS^X MANOVA Procedure," *Benchmarks*, Volume 10 Number 5, May/June 1989 (pp. 6-9).
- "Exporting Data and Programs from SPSS^X to SPSS/PC+," *Benchmarks*, Volume 10 Number 5, May/June 1989 (pp. 9-10).
- BENCHMARKS FORUM — the difference between Type I and Type III sums of squares in SAS PROC GLM , *Benchmarks*, Volume 10 Number 5, May/June 1989 (pp. 10-13).

Academic Computing Services Documents

These are documents, many of them used in Computing Center Short Courses, are available from the Computing Center reception area (ISB 119).

- *Introduction to SPSS^X*
- *Introduction to SAS*
- *SAS-PC*
- *SPSS/PC+*
- *SAS-PC Macro Language*
- *SAS-PC Micro to Host Link*
- *Introduction to COMPUSTAT II*

For further information about statistical packages, contact Academic Computing Services, ISB 119 (817-565-2324).■

Changes to SAS Software Offerings

By Dr. Philip Baczewski, Academic Mainframe User Services Manager (BITNET: AC12@UNTVM1)

The changes to the configuration of SAS software on the academic mainframe system announced in the September 1990 issue of *Benchmarks* (pp. 24-26) have occurred on a more accelerated schedule than originally planned. The following configuration is now in effect:

- **MVS** — SAS version 5.18 with the BASE and STAT modules
- **CMS** — SAS version 5.18 (NTLINK SAS) with the BASE, and GRAPH modules SAS version 6.06 (NTLINK NEWSAS) with the BASE, STAT, ETS, GRAPH, OR, and IML modules

Our contractual agreement with SAS Inc. has prevented us from maintaining the OR, ETS, and IML modules on the MVS system for as long a period as originally planned. These modules are currently accessible under SAS version 6.06 on CMS. Most programs which were run under MVS will run under CMS with few or no changes. If you have any questions about the current configuration or need assistance with using SAS under CMS read the following article and/or contact Panu Sittiwong of Academic Computing Services (ISB 119, 565-2324). ■

A Review of SAS Version 6.06 for the VM/CMS Operating System.

By Panu Sittiwong, Academic Computing Consultant (BITNET: PANU@UNTVM1)

As part of the increased support of the VM/CMS operating system, the Computing Center has finished installing SAS Version 6.06 on the HDS 8083 mainframe running under VM/CMS. There are several new features in this version of SAS. SAS 6.06 is the first implementation of the SAS system which emphasizes compatibility across hardware platforms. To enhance the portability of the software, SAS Institute decided to rewrite the SAS system in the C programming language. The first implementation of this version occurred in 1984 when SAS introduced SAS/PC. The rewrite, which was completed in June 1990, took five years and was hailed by SAS Institute President James Goodnight as "the largest software engineering effort in the history of commercial computing."[1] The project doubled the size of the SAS System, taking it from 1.5 million to 3 million lines of code.

Besides portability, the new SAS provides several features which weren't available in version 5.18. This article will present those major new or enhanced features. A complete explanation of all the changes and enhancements can be found in the most recent edition of the appropriate SAS manual (see the end of this article for a complete list of SAS manuals — available in the University Store — appropriate to UNT). For example, a summary of the enhancements of SAS/BASE can be found on pages xxiii-xxix of the *SAS Language: Reference, Version 6 First Edition*. The enhancements can be categorized as general enhancements, enhancements in the SAS Data Step, and enhancements in SAS Procs.

[1] *Software Magazine*, June 1990 Special Edition (page 14).

General Enhancements

Multiple Engine Architecture

SAS 6.06 is a new design of the SAS system with the implementation of what is called *Multiple Engine Architecture*. With this system, you are able to access a variety of different types of data files as if they are SAS data sets. For example, SAS will directly recognize SPSS-X system files and SPSS EXPORT files as if they are SAS datasets. This allows you to directly analyze SPSS datasets with SAS PROCs. The Multiple Engine Architecture is a two way street. It also allows you to analyze a SAS dataset in the format of other software system files.

SAS/PC to SAS/CMS

SAS 6.06 under VM/CMS is the first large-scale interactive version of SAS available at UNT. Interactive SAS allows you to start using SAS effectively with minimal CMS knowledge or experience. SAS/PC users, in particular, will have an easy time with interactive SAS on CMS. SAS/CMS and SAS/PC have an almost identical Display Manager System.

With SAS available on CMS, it is possible for those who have SAS/PC installed on their PC to run SAS/PC and SAS/CMS simultaneously. This will allow you to analyze data stored on your PC using procedures which are available on CMS and bring the output back to PC. Academic Computing Services is currently working on a script file which will establish the connection from SAS/PC to SAS/CMS automatically. As soon it is ready we will put an announcement in *Benchmarks* and in the system news on the VAX, CMS and MUSIC.

Running SAS 6.06 on CMS

SAS under CMS can be run either interactively or in batch mode. Batch processing requires that you create a SAS command file using XEDIT and submit it to SAS for execution. Interactive execution takes advantages of a relatively new feature of SAS system called the "Display Manager". We encourage you to take advantage of this new feature rather than running a batch job.

Batch Processing under CMS

As mention above, batch processing requires you to create a SAS command file. The command file can have any filename you like but it must have a filetype of SAS. This file should contain all the SAS statements neccessary to complete the job. The following example shows how to execute SAS in batch mode (you type the ***bold italic*** lines).

```
Ready;
ntlink newsas        (Link to the SAS mini-disk)
Ready;
sas filename         (Submit a SAS program file, where filename is the name
                      of the CMS file with a FILETYPE of SAS on your A disk)
```

After the program has executed, SAS will produce two separate files on your minidisk. Both of these new files have the same filename as the program file with the filetypes of SASLOG and LISTING. The former contains the SAS program commands and notes error messages, if any. The latter contains all the output generated by the SAS procedures.

Interactive SAS and Display Manager System

Interactive SAS utilizes CMS fullscreen capabilities and PF keys. In this environment, your screen is divided into several small windows which make up the SAS Display Manager System(DMS). To start SAS using the Display Manager System, enter the following CMS commands (shown in ***bold italic***):

```
ntlink newsas
Ready;
sas

Interactive SAS needs a minimum of 4M of memory. Type
   DEF STOR 4M <Return>
   I CMS <Return> <Return>
Then issue the NTLINK NEWSAS command.
```

Compiling the Data Step

Another general enhancement is the ability to compile SAS Data Steps. In this release, you can compile the the contents of your Data Steps and execute them at another time. This is useful when you are reading several datasets in the same way at different times. For example, you can compile a data step which will read data from several waves of your survey. Instead of having to recompile the data step for each set of data, you can compile and save the data step and call it to read the data each time you need it. The SAS program on the following page shows how this is done.

```
Title 'Sample SAS Program For Compiling a SAS Data Step';

LIBNAME stored 'A';

DATA Survey;
        INFILE datain;
        INPUT (v1-v100) (1.0);
        etc . . .;
```

The above program will compile the above data step and save it in the library called **stored** on your CMS minidisk A with the filename of **Survey** and filetype of **stored**. The following SAS program will call the stored program and perform data analysis on the data set called WAVE1 DATA A.

```
Title 'Sample SAS Program For Using Compiled SAS Data Step';

FILENAME datain 'wave1 data a';
LIBNAME stored 'A';

DATA PGM=stored.survey;
PROC PRINT;
etc . . .;
```

The WHERE Statement

Another new feature is the ability to subset SAS data sets in both the Data Step and Proc Step. SAS introduced the new statement called **WHERE** which can be used to subset a SAS data set in both the Data Step and the Proc Step . The following example shows how **WHERE** can be used in the Proc Step.

```
Title 'Sample SAS Program With WHERE Statement';

PROC PRINT DATA=survey;
        VAR v1-v5;
        WHERE lastname LIKE 'MC%' AND v6='Male';
        RUN;
```

When this program is executed, SAS will only print those observations whose lastname variable starts with Mc (the % sign is used in this context as a wild card) and in which the value of v6 is 'male.' This command can greatly enhance the efficiency of SAS processing time.

SUGI Library No Longer Supported

One change that may have a negative impact on you is that this version of SAS will no longer support SUGI Supplemental Library PROCs. If you are currently using any of those PROCs, therefore, you may want to take steps to find a comprable procedure to do your analysis.

Data Step Enhancements

The majority of changes and enhancements in SAS 6.06 are in the Data Step. These improvements include:

- Easier access to external data files and SAS data sets.
- New statement introduced to simplify SAS programming.
- Improved ARRAY processing.
- The ability to create virtual data sets.

The FILENAME, LIBNAME and INFILE Statements

In the previous version, external data files and SAS system files are referred to by operating system commands — i.e., using the DD statement in OS/MVS or FILEDEF command in VM/CMS. In Version 6.06, these files can be referred to by using the FILENAME, LIBNAME and INFILE statements. FILENAME assigns nickname to a CMS file, LIBNAME defines the minidisk on which the SAS system dataset is stored, and INFILE is used to fetch data into a SAS program. The program on the following page shows how these three commands are used.

The FILENAME statement is used to assign the name **datain** for the CMS file called SURVEY DATA A. LIBNAME then creates a SAS data library called **sasfile** which is located in CMS minidisk A. When the program is executed, SAS will retrieve the raw data from the SURVEY DATA A file. Since the DATA statement specified a two level name, SAS will create a permanent SAS system dataset and store it on the CMS minidisk specified by the LIBNAME statement. In the example, the permanent dataset will be stored in the CMS file called **SURVEY SASFILE A**.

```
Title 'Sample SAS Program';

FILENAME datain 'SURVEY DATA A';
LIBNAME sasfile 'A';

DATA sasfile.survey;
        INFILE datain;
        INPUT etc . . .;
        RUN;
```

Restructured Data Set

Another new feature in SAS is that the SAS data set has been restructured to add such database-style features as indexing and data compression. Indexing can be either regular (based on one variable) or composite (based on more than one variable). Indexing of the variable provides two major benefits:

❶ Indexing provides a faster access to a small subset of observations represented in the index.

❷ If a BY statement is used in the PROC Step, then PROC SORT is not required. This will help speed up the processing and save on CPU time.

All of these enhancements, however, have some cost associated with them. Version 6.06 data sets are generally bigger than version 5 data sets and thus require more disk storage. The data sets can be compressed, however, but that has some negative aspects. For example, observations in the compressed data set can't be addressed by observation number and it will require more CPU time to access the data set.

Array Processing

Array processing, as stated earlier, has been improved. Now you can:

❶ Refer to the element in the array.

❷ Assign initial values to the elements.

❸ Create temporary array elements.

❹ Create multidimensional arrays.

New Procedures

SAS made some changes and enhancements in several of the Version 6.06 PROCs. Printed output from many procedures has a new format, so you may have to spend a little more time to interpret your results the first time you run a PROC.

Two new Statistical Procedures were added to the SAS STAT product. They are PROC LOGISTIC and PROC CALIS. PROC LOGISTIC performs Logistic Regression for the model with a dichotomous or ordinal dependent variable. PROC CALIS can be used for analysis of covariate structures, linear structure equations with latent variables and path analysis.

Two utility procedures are added to the BASE system. PROC SQL is the implementation of the SQL language on the SAS system. This procedure can be used to manipulate SAS datasets and generate reports. PROC REPORT allows you to create a report template for SAS data sets. It is intended to replace report writing using the FILE and PUT statements in the earlier version.

A Matter of Conversion

Interactive SAS, version 6.06, is currently available as a test version on VM/CMS. Therefore, if you wish to take advantage of the interactive SAS environment and you have been using MUSIC/SP, you will need to move your programs and data from there to CMS. If your User-Id is not authorized for CMS, you can request an update to your ID. To do this, come by the Computing Center and pick up a pink "UNT Computing Center User-Id Update Form," fill it out indicating that you wish to add CMS access and return it to ISB 119 for processing.

You can send SAS programs and raw data files to CMS with the MUSIC SENDFILE command. It has the following format:

SENDFILE filename TO idnn AT UNTVM1

Where **filename** is the name of MUSIC file you want to send and **idnn** is your CMS ID.

The files will be stored in your CMS reader. To retrieve the files, issue the CMS command **RDRLIST**. You can receive the file, i.e. move it to your CMS library, by entering the following command in the command area in front of the filename.

RECEIVE / fn ft fm

Where **fn** is the CMS filename and **ft** is the CMS filetype (you need to name SAS programs with the filetype SAS). **fm** is filemode. It is usually A. You may have to type over the name.

You can then use XEDIT, the full-screen editor on CMS, to remove all the JCL command lines and make all the necessary changees before you submit your file to SAS (see the box on page 4 for instructions on how to invoke and submit a SAS program. The article "Transporting SAS Data Sets from OS SAS Release 5.18 to CMS SAS Release

6.06" on page 8 shows the steps you need to take in order to move SAS system data sets to SAS 6.06).

New Documentation

SAS Institute also re-organized the documentation for Release 6.06. It is possible to use Version 5 documentation, but you will need the new documentation if you plan to take full advantage of the new system. The following table provides a quick guide to SAS Version 6.06 manuals relevent to our installation, along with their Version 5 equivalents. Please note that all these documents are available for reference in the ISB 110 Lab. All manuals are available for purchase in the University Store. ■

Version 5 Manuals	Version 6 Manuals
SAS User's Guide: Basics, Version 5 edition.	*SAS Language: Reference*, Version 6 First Edition — explains the SAS system and commands, including the use of the SAS Display manager. *SAS Procedure Guide*, Third Edition — contains syntax for all the SAS/BASE PROCs. *SAS Language and Procedures*: Version 6, First Edition — a good introductory book, it demonstrates several useful SAS techniques. *SAS Guide to Macro Processing*, Version 6, Second Edition — demonstrates the use of SAS Macros.
SAS Companion for the CMS Operating System, 1986 Edition	*SAS Companion for the CMS Environment*, Version 6, First Edition — contains all information pertinent to using the SAS system under CMS .
SAS User's Guide: Statistics, Version 5 Edition.	*SAS/STAT User's Guide*, Version 6, Forth Edition, Vols 1 & 2 — contains syntax for all SAS statistical procedures.
SAS/GRAPH User' Guide, Version 5 Edition.	*SAS/GRAPH Software* ,Version 6, First Edition, Vols 1 & 2 — contains syntax for all SAS/GRAPH procedures.
SAS/ETS User's Guide, Version 5 Edition.	*SAS/ETS User's Guide*, Version 6, First Edition — contains syntax for all procedures in the Econometric and Time Series module.
SAS/OR User's Guide, Version 5 Edition.	*SAS/OR User's Guide*, Version 6, First Edition — contains syntax for all procedures in the Operation and Research module.
SAS/IML User's Guide, Version 5 Edition.	*SAS/IML User's Guide*, Version 6, First Edition — contains all statements and samples of the IML product. *SAS Guide to the SQL Procedure: Usage and Reference*, Version 6, First Edition — explains the implementation of SQL on the SAS system.

Transporting SAS Data Sets from OS SAS Release 5.18 to CMS SAS Release 6.06

By Phanit Laosirirat, Academic Computing Consultant (BITNET: AC44@UNTMUSIC)

One obstacle that prevents OS SAS users from moving to a better and improved CMS SAS Release 6.06 is data file incompatibility. A SAS data set that is created by using OS SAS Release 5.18 cannot be used as a data set on CMS SAS Release 6.06. There are two problems involved if you want to move from OS SAS to CMS SAS.

1. Moving from OS SAS to CMS SAS means that you are moving into a very different environment, which SAS refers to as a different host. This creates a problem that requires you to transfer your SAS data sets from the OS host to the CMS host.
2. Once a SAS data set has been transferred, it does not mean that CMS SAS can read your data set without modification. Your data set needs to be converted to the format that can be recognized by CMS SAS.

Why Would You Want CMS SAS?

CMS SAS Release 6.06 offers a user interface that replicates an interface used by PC SAS. SAS users who are not full-time faculty and staff can now use a SAS PC-like environment on CMS SAS. CMS SAS also has procedures that Release 5.18 does not have, for example, **PROC CALIS** (Covariance Analysis of Linear Structural Equations) and **LOGISTIC** (Logistic Regression). There are a lot more utility procedures that have been added to CMS SAS Release 6.06. New software interfaces is another improvement of CMS SAS Release 6.06. For example Release 6.06 can access **BMDP, SPSS, and OSIRIS** files.

Transporting SAS Data Sets from OS to CMS

The following sample job converts and transports a SAS data set, **COUNTRY**, which is saved on **VOL=SER=ACAD02** as **DSN=USER.ZZ99.SASDATA**, to CMS. It is assumed that your **CMS ID** is **ZZ99** (don't forget to use *your* ID).

```
//ZZ99PORT JOB (ZZ99,:30,1),'MISTER -- X',CLASS=A,PASSWORD=MVSPWORD
/*ROUTE PRINT UNTVM1.ZZ99
/*ROUTE PUNCH UNTVM1.ZZ99
//*****************************************************************************
//*
//*                    Step 1: SAS Job
//*
//*****************************************************************************
//STEP1 EXEC SAS
//SASIN DD DSN=USER.ZZ99.SASDATA,DISP=OLD,VOL=SER=ACAD02,UNIT=SYSDA
//XPORT DD DSN=&&PORT,UNIT=SYSDA,VOL=SER=ACAD03,
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=8000),SPACE=(TRK,(5,0),RLSE),
// DISP=(NEW,PASS)
PROC XCOPY IN=SASIN OUT=XPORT EXPORT;
 SELECT COUNTRY;
//*****************************************************************************
//*
//*                    Step2: IEBGENER sends punch output to CMS
//*
//*****************************************************************************
//STEP2 EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=A
//SYSIN DD DUMMY
//SYSUT1 DD DSN=&&PORT,DISP=(OLD,DELETE)
//SYSUT2 DD SYSOUT=B
/*
//
```

These are steps that you need to follow in order to successfully move an OS SAS data set to a CMS SAS data set.

1. Log on to your CMS userid.
2. Use XEDIT to create a file, for example **SAS5TO6 SAS.**
3. Type the above program setup into the **SAS5TO6 SAS** file. Save the program by using the command **FILE.**
4. At the CMS **READY;** prompt type **SUBMIT SAS5TO6 SAS.** You will get these messages back on your screen:

```
PUNCH FILE 0281 SENT TO MVSSP
RDR AS 5067 RECS 0143 CPY 001 M
NOHOLD
```

A few seconds later you will get more messages resembling the following lines.

```
RDR FILE 0282 SENT FROM RSCS PRT
WAS 9481 RECS 0192 CPY 001 A
NOHOLD
DMTAXM104I FILE (0548) SPOOLED
TO AC44 — ORIGIN
ACADMVS(SYSTEM)...
RDR FILE 0283 SENT FROM RSCS PUN
WAS 9482 RECS 0106 CPY 001 B
NOHOLD
DMTAXM104I FILE (0548) SPOOLED
TO AC44 — ORIGIN
ACADMVS(SYSTEM)...
```

5. Go into the Reader List by typing **RDRLIST.** Once you are in your Reader you will see the screen on the following page.

   You will notice that the filenames are the same as the name that you used for the job card (the first line in the program).

6. Move the cursor down to the line that has **PUN B** in the CLASS column and type this command over that line: **RECEIVE / fn ft fm.** Where **fn** is a filename, **ft** is a filetype, and **fm** is a filemode. These names are optional, if you want to you can use the same filename and filetype that CMS has provided. In this case, they are **ZZ99PORT** and **OUTPUT** respectively. If you have errors in your program, you will

have only one output file that has **PRT A** in the CLASS column. Print class output is not the data that you want, so you will need to use the **PEEK** command to check the errors.

ZZ99	RDRLIST	A0	V	108	Trunc=108	Size=2	Line=1
Cmd	Filename	Filetype	Class	Use	at Node	Hold	Records
	ZZ99PORT	OUTPUT	PRT A	SYSTEM	ACADMVS	NONE	192
	ZZ99PORT	OUTPUT	PUN B	SYSTEM	ACADMVS	NONE	106

❼ After you have received the output, you get out of RDRLIST by using **PF3**.

❽ Do the CMS LINK command to access to the SAS disk by typing **NTLINK NEWSAS**.

❾ Start a SAS session by typing **SAS**.Type the following program in the SAS Program Editor Window.

```
LIBNAME PORT XPORT 'ZZ99PORT OUTPUT A';
LIBNAME SASFILE6 'A';
PROC COPY IN=PORT OUT=SASFILE6;
RUN;
```

❿ Bring the cursor to the command line and type **SUBMIT**. A SAS transport file, **ZZ99PORT OUTPUT**, is copied into the new host format under the name **COUNTRY SASFILE6**. ■

SAS User's Group Meeting to be in New Orleans in '91

The 16th Annual SUGI (SAS Users Group International) Conference is scheduled for February 17-29, 1991 at the New Orleans Hilton Riverside and Towers. Although the deadline is passed for submissions of papers to this conference, there is still time to enter the SAS Graphics Competition and Exhibit. According to *SAS Communications* — the Quarterly Magazine for SAS Software Users (Third Quarter, 1990) — "entries in the 'Most Creative use of software' and 'Best presentation of data' categories will be accepted in two divisions: color and monochromatic. Graphics produced by any SAS procedure will be accepted." Following are the competition rules, excerpted from the *SAS Communications* referenced above.

- ❑ One entry per person per category.
- ❑ Entries may win in only one category.
- ❑ Each entry should be no larger than 11 inches by 17 inches, hard copy only.
- ❑ Entries should not be mounted.
- ❑ On the back of the graph, clearly label the entry lightly in pencil with the author's name, full address,phone number, and the category and division of competition. Do not include any of this information on the front of the entry. Entries without proper labeling will not be considered in the competition.
- ❑ The code used to create the display must accompany work (along with a sample of the data for work submitted to the "Best presentation of data" category). Entries submitted without code and/or source data will not be considered in the competition.
- ❑ A one -page description of the entry explaining how the graph was generated and any possible applications is required with each entry.
- ❑ Attendance at the meeting is not required for entry in the competition.
- ❑ All materials become the posession of SUGI and will not be returned.
- ❑ Mail entries **no later than January 21, 1991**, to Chris Potter, Syntex Laboratories, Inc., 3401 Hillview Avenue, Mailstop P1-250, Palo Alto, CA 94304. Telephone: 415-855-6031. FAX: 415-354-7038.

Another item of interest at SUGI 16 is the *Consultants' Registry*. This is a list of people who consider themselves to be particularly expert in specific aspects of the SAS system and would like to consult with others on those areas. You do not have to be present at SUGI to register as a consultant, however you must complete a form specifying your areas of expertise and previous experience. This should be returned to the SUGI Coordinator by January 21, 1991. For more information about the registry, contact Philip Miller, Washington University School of Medicine: Biostat, P.O. Box 8067, St. Louis, MO 63110. Telephone: 314-362-3617. FAX: 314-362-9862.

If you are interested in attending SUGI 16, you can call the registration coordinator at 919-677-8000 and request a registration packet. ■

Want to Write a Book?

If you are interested in writing a book about SAS software, you're task has just been made easier. You can request a brochure from SAS Institute that explains the process of working with the Institute to publish your book. For more information, contact the Acquisitions Editor at 919-677-8000.

SPSS Release 4.0 for OS/MVS: A Review

By Panu Sittiwong, Academic Computing Consultant (BITNET: PANU@UNTVM1)

The Computing Center has recently installed SPSS Release 4.0 (SPSS Inc has dropped the letter X from this version) on the academic mainframe running under the OS/MVS operating system. This version will become the default product at the beginning of the spring semester. SPSS 4.0 provides a variety of improvements and several new procedures. The most significant improvement is the incorporation of LISREL 7 and PRELIS as a part of the system.

New Procedures

The following procedures are new in SPSS Release 4.0.

EXAMINE is a procedure for exploring data. EXAMINE provides stem-and-leaf plots, boxplots, robust estimates of location, tests of normality and other descriptive statistics and plots. Separate analyses can be obtained for subgroups of cases.

FLIP is a facility for transposing data on the SPSS active system file, so that what was in row 1, column 2 is transposed to be in row 2, column 1, and so forth (i.e. converting variables into observations and observations to variables).

LOGISTIC REGRESSION regresses a dichotomous dependent variable on a set of independent variables.

MATRIX and END MATRIX are commands that enclose statements that are executed by the SPSS MATRIX processor. Such MATRIX programs enable you to write your own statistical routines using the compact language of matrix algebra. MATRIX programs can include mathematical calculations, control structures, display of results, reading and writing matrices as character files or SPSS system files.

LISREL and PRELIS

Although the majority of LISREL 6 commands are similar to those in LISREL 7, they require some modification before they can be used in LISREL 7. One of the major changes from LISREL 6 to 7 is the use of PRELIS as a procedure for preparing SPSS data into matrix data for LISREL. Another major change is from the LISREL command structure to that of SPSS commands and sub-commands. All LISREL 6 commands are now subcommands in SPSS which are required to be indented and preceded by a slash (/) — see sample program below).

In SPSSX Version 3.1, LISREL 6 is available as a userproc. SPSS 4.0 incorporates LISREL 7 and PRELIS as a part of SPSS Advanced Stat. As stated earlier, the PRELIS command and its sub-commands are used to prepare the matrix to be read by LISREL. PRELIS can read raw data on continuous, censored, and ordinal variables and compute many different measures of association between pairs of such variables.

Since both LISREL and PRELIS are supported as SPSS commands, they more fully integrated into SPSS than the previous userproc was. For example, LISREL can read SPSS system files, and PRELIS can write SPSS matrix system files. See the table below for help in converting your old LISREL program to the new Version 4.0 conventions. This example compares the job steam of LISREL 6 and LISREL 7 when you already have matrix data.

Beyond operation convenience, LISREL 7 provides several new features including the Ridge option, WLS and DWLS estimation methods.

OLD SETUP	NEW SETUP
*** Dummy Data Step***	**Using SPSS Matrix Data command to read Matrix Data**
INPUT PROGRAM NUMERIC DUMMY END FILE END INPUT PROGRAM	MATRIX DATA VAR = V1 to V9 /FORMAT = FULL /CONTENTS = COV /N = 1926
*** Start LISREL. All the Commands are LISREL commands** USERPROC NAME=LISREL	BEGIN DATA /INC cov.matrix **(Read in Matrix Data)** END DATA
'Sample LISREL 6 Program'	*** Start LISREL 7 Commands. The First Command is LISREL**
DA NI=9 NO=1926 MA=CM CM FU /INC cov.matrix **(Read in Matrix Data)** SELECT 1 2 3 4 5 6 7 8 9/ MO NX=4 NK=2 NY=5 NE=2 TD=FU,FI PH=ST GA=FU,FI TE=FU,FI PS=DI BE=SD LK 'Factor1' 'Factor2' LE 'Latent1' 'Latent2' etc.....	LISREL /"Sample LISREL 7 Program" /DA NI=9 NO=1926 MA=CM /SELECT /1 2 3 4 5 6 7 8 9 /MO NX=4 NK=2 NY=5 NE=2 TD=FU, FI PH=ST GA=FU,FI TE=FU,FI PS=DI BE=SD /LK /Factor1 Factor2 /LE /Latent1 Latent2 /etc.....

The Ridge option is added in order to be able to handle covariance and correlation matrices that are not positive definite, such as those with multicollinearity problems or econometric models containing identities.

WLS (Weighted Least Squares) produces asymtotically correct standard errors and chi-square values under non-normality or when one or more of the observed variables are ordinal. It is useful in analyzing policholic and polyserial correlations, ordinal variables, and non-normal distributions.

The DWLS (Diagonally Weighted Least Squares is useful in the computation of large asymptotic covariance matrices.

More information concerning the differences between LISREL 6 and LISREL 7 can be found in *LISREL 7 A Guide to the Program and Applications* pp. iii-v.

The example below shows the program setup when the SPSS **DATA LIST** command is used to read raw data and **PRELIS** is used to create a data matrix for LISREL.

```
DATA LIST / v1 to v9
BEGIN DATA
/INC raw.data
END DATA
PRELIS
 /VARIABLES = v1 to v9 (co)
 /MATRIX = OUT(*)
 /TYPE = covariance
LISREL
 /"Sample LISREL 7 Program"
 /DA NI=9 NO=1926 MA=CM
 /SELECT
  /1 2 3 4 5 6 7 8 9
 /MO NX=4 NK=2 NY=5 NE=2 TD=FU,FI
    PH=ST GA=FU,FI TE=FU,FI PS=DI
BE=SD
 /LK
  /Factor1 Factor2
 /LE
  /Latent1 Latent2
 /etc.....
```

New Manuals For SPSS 4.0

The manuals listed below are available for purchase in the University Store. They are also available for reference purposes in ISB 110.

SPSS Reference Guide, SPSS Inc., 1989. The *Reference Guide* contains the universal rules that apply to all SPSS commands. It also contains an alphabetic reference to all the commands in the basic MVS system, excepting a few operating-system-dependent commands discussed in the *SPSS for IBM MVS: Operations Guide*. This guide defines and gives examples of all the commands, subcommands, and keywords in SPSS for MVS (not including commands in the add-on options).

SPSS Base System User's Guide, SPSS Inc., 1989. This manual is a guide to analyzing data using the commands available in the base system of SPSS. It explains many of the statistical concepts involved, and provides a brief discussion of the options available for each command. Its primary emphasis is statistical.

SPSS Advanced Statistics User's Guide, SPSS Inc., 1989. The *Advanced Statistics Guide* documents the procedures that perform advanced analyses, such as discriminant analysis, nonlinear and logistic regression analysis, and multivariate analysis of variance. The manual contains statistical discussions and, for each advanced procedure, a brief discussion of how to run the procedure. The complete reference for the commands is included in the *SPSS Reference Guide*.

SPSS for IBM MVS: Operations Guide. The *Operations Guide* tells you how to run SPSS in a MVS operating system, including information on how to create and save SPSS command files; build and run commands; get online help; run SPSS from prompts. This manual is not recommended for purchase. It is designed mainly for those who run SPSS under MVS and TSO and we do not support TSO at UNT.

All the neccesary information concerning creating, saving and retriving SPSS system files can be found in the *JCL Reference Card for Statistical Packages* produced by the Computing Center. It is available at the bookstore.

SPSS Trends. The *Trends* manual documents SPSS' time series analysis and forecasting tool — Trends. Trends includes curve-fitting, smoothing, special regression, seasonal adjustment, and Box-Jenkins/ARIMA modeling procedures. A complete reference to commands in Trends is included in this manual.

SPSS LISREL 7 and PRELIS User's Guide and Reference documents the operations of SPSS LISREL 7 and PRELIS. A more complete discussion of the LISREL program, focusing on sample applications, is available in the manual *LISREL 7, A Guide to the Program and Applications*. ■

New COMPUSTAT Tapes Arrive

By Phanit Laosirirat, Academic Computing Consultant (BITNET: AC44@UNTMUSIC)

Academic Computing Services has recently received the new COMPUSTAT II tapes from Standard & Poor's Compustat Services, Inc. The following tapes were received:

- The Industrial tape
- The Research tape
- The OTC tape
- The Bank tape
- The PDE tape.

The cut off date for data on these tapes is 7/31/90. As usual, COMPUSTAT data is available 20 years back from the cut off date.

Although these new tapes have already arrived at the Computing Center, they will not be available until approximately the **last week of November 1990**. This is due to the amount of time that is required for converting the COMPUSTAT data into SAS data sets for ease of access.

The method of accessing the COMPUSTAT data will remain the same except the data set name of each tape will be changed. If you want to use the new COMPUSTAT tapes after November 1990, you will need to use the following Job Control Language statements and SAS statements to retrieve the new COMPUSTAT data library files.

- Industrial File

```
//COMPSTAT DD DISP=SHR,
// DSN=USER.AC44.COMSTAT2.INDUS90
DATA INDUSTRY;
 SET COMPSTAT.INDUSTRY;
```

- Research File

```
//COMPSTAT DD DISP=SHR,
// DSN=USER.AC44.COMSTAT2.RES90
DATA RESEARCH;
 SET COMPSTAT.RESEARCH;
```

- OTC File

```
//COMPSTAT DD DISP=SHR,
// DSN=USER.AC44.COMSTAT2.OTC90
DATA OTC;
 SET COMPSTAT.OTC;
```

- BANK File

```
//COMPSTAT DD DISP=SHR,
// DSN=USER.AC44.COMSTAT2.BANK90
DATA BANK;
 SET COMPSTAT.BANK;
```

- PDE File

```
//COMPSTAT DD DISP=SHR,
// DSN=USER.AC44.COMSTAT2.PDE90
DATA PDE;
```

Don't Buy Stolen Merchandise!

An article in the September 1990 issue of *Benchmarks*, "Computer Sales Held Monthly," stated that some items at the midnight sale on 75 and Ross Avenue in Dallas are rumored to be "warm." This was mentioned as a warning, not an inducement to purchase such items. It is illegal as well as morally wrong to purchase stolen goods, so don't.

NT Statpak Still Available

By George Morrow, Academic Computing Consultant (BITNET: AS01@UNTVM1)

An old statistical friend, who may still be remembered by some here at UNT, is the *North Texas Statistical Package*. This is a notice that it is still available and a reminder of the programs it contains. One of these programs, ST033, is used on a daily basis to analyse and/or score tests.

The *North Texas Statistical Package* is a collection of programs that perform various statistical procedures. It was developed by the Computing Center Research Programming staff in the early 1970's. Although most of these statistical procedures can now be found in the SPSS, SAS, BMDP, and other packages, you may find here a program that presents the statistical analysis more like you prefer. Sample output from these programs is available in the Academic Mainframe User Support group.

Following is a list by functional classification of the NT Statistical Programs:

Data Description

- ST008 — Numeric Frequency Distribution
- ST009 — Mean and Standard Deviation
- ST010 — Alpha-numeric Single Column Frequency Distribution
- ST016 — Standard Scores
- ST018 — Standard Deviation Conversion
- ST022 — Percentiles
- ST036 — Distribution Statistics and Standard Scores
- ST038 — Dual-column Frequency Distribution
- ST044 — Double-column Numeric Frequency Distribution

Non-Parametric Statistics

- ST025 — Chi Square
- ST026 — Kendall's W-Coefficient of Concordance
- ST028Z — Test Between Percentages
- ST029 — Spearman's Rank Order Correlation
- ST032 — Mann-Whitney U Test
- ST035 — Kolmogorov-Smirnov One and Two-Sample Tests

Test Analysis

- ST002 — Test Scoring Analysis
- ST033 — Item, Test, and Homogeneity Analysis

Regression & Correlation

- ST004 — Multiple Linear Regression
- ST005 — Simple Linear Regression
- ST006 — Simple Correlation
- ST023 — Biserial & Point-biserial Correlation
- ST027 — Simple Correlation with Missing Data
- ST037 — Simple Linear Regression (all combinations of variables)
- ST041 — Stepwise Multiple Linear Regression
- ST042 — Eta Coefficient (non-linear correlation)

Analysis of Variance

- ST001 — Analysis of Variance (One-way design)
- ST003 — T-Test for Correlated Samples (differences)
- ST012 — Analysis of Variance (Three-way design)
- ST013 — Analysis of Variance (Two-way design)
- ST014 — Analysis of Covariance (One-way design)
- ST015 — Hotelling's T Squared
- ST017 — Single and Two Factor Analysis of Variance with Repeated Measures
- ST019 — Analysis of Covariance (Two-way design)
- ST020 — Wilk's Lambda
- ST021 — Multivariate Analysis of Variance (Two-way design)
- ST024 — Three-factor Analysis of Variance with Repeated Measures
- ST030 — Comparisons of Independent Means
- ST040 — Analysis of Variance (Two or three way with range tests)
- ST043 — Two-way Analysis of Covariance with Repeated Measures

Multivariate Analysis

- ST007 — Hierarchical Profile-grouping Analysis
- ST011 — Principal Axis Factor Analysis
- ST021 — Multivariate Analysis of Variance (Two-way design)
- ST031 — Multiple Discriminant Analysis
- ST034 — Canonical Correlation
- ST039 — Judgement Analysis

These programs may be executed on MVS (on the mainframe) by executing the STAT01 procedure shown on the following page.

Continued on page 15.

OS/MVS JCL: The DD Statement

By Cathy Hardy, Academic Database Consultant (BITNET: AI55@UNTVM1)

This is the first in a series of articles dealing with JCL (job control language). This series is aimed at the current JCL user who would like to have a better understanding of statement use and coding options. If you are not currently a JCL user, but would like to begin learning about JCL, Academic Computing has a free handout available in ISB 119. Stop by and ask for 'IBM Job Control Language,' or contact an Academic Mainframe User Support consultant for further information.

The DD statement (**d**ata **d**efinition) describes a data set used in a job step of your JCL as well as defining input and output facilities required by the data set. In other words, the DD statement defines a file on tape, disk, (or cards!) and requests the allocation of needed input/output devices.

A DD statement must be included after an EXEC statement for each data set used in the job step. The DD statement consists of double slashes (//) in columns 1 and 2, a name unique to the job step (beginning in column 3, consisting of 1 to 8 characters - the first character must be alphabetic or national), operation (DD), and operand(s). For example:

```
//INPUT1 DD DSN=USER.XXNN.CLASS.1990,UNIT=SYSDA,
//        DISP=(NEW,KEEP),VOL=SER=ACAD01,
//        SPACE=(TRK,(1,1),RLSE),
//        DCB=(LRECL=80,RECFM=FB,BLKSIZE=800)
```

If your DD name (in the above example - INPUT1) is not unique within the JOB STEP, your JCL will not abend, but only the first data set will be referenced. (This is site specific and **applies to UNT**. At other locations, refer to your IBM JCL manual and check with your system administrator.)

Special DD names

Special DD names have meaning to the system and are to be used when you make use of the facilities described below. (For a complete discussion of DD special names, see your IBM JCL manual). The following DD names are "Special ":

- JOBCAT
- JOBLIB
- STEPCAT
- STEPLIB
- SYSABEND
- SYSMDUMP
- SYSUDUMP
- SYSCHK***
- SYSCKEOV***

JOBCAT defines a user catalog to the system that is to be used during the job . The system will look here for data sets before searching the master or private catalog associated with the DSN parameter.

JOBLIB defines a private library to be searched before searching system libraries for the program named in the EXEC statement.

STEPCAT defines a private VSAM user catalog for the duration of the job step which will be searched before the master or private catalog associated with the DSN.

*** SYSCHK and SYSCKEOV are site specific, and while not in use at UNT, the system will still recognize them as special names.

STEPLIB defines a private library which is to be searched before system libraries are searched for the program in the EXEC statement.

SYSABEND produces a dump of the processing program and what is contained in the operating system at the time of abend.

SYSMDUMP produces a machine readable dump of the processing program and what is contained in the operating system at the time of abend.

SYSUDUMP produces a dump of the program being processed at the time of abend.

SYSCHK describes a checkpoint data set. See footnote on page 13.

SYSCKEOV defines a checkpoint data set for records. See footnote on page 13.

Parameters

There are two types of parameters that can be coded on a DD statement: positional and keyword.

❶ **Positional parameters** — which must precede any keyword parameters, are:

```
*        DUMMY
DATA     DYNAME
```

The * parameter specifies that data follows the DD statement. The system will look for an input delimiter (// or /* in the first two columns) and will assume that everything between the DD statement and the delimiter is data. This data can be, for example, program source code or input data to be used by a program.

Example of "In Stream" Program and Data

```
//PGM1   DD *
program line 1
program line 2
program line 3
/*
//INPUT1   DD *
data line 1
data line 2
/*
```

The DATA parameter specifies that data for a program is following the DD statement. This data can contain statements with double slashes in columns 1 and 2. For example:

```
//ddname  DD DATA
//data1
//data2
//data3
/*
```

The DUMMY parameter indicates to the system that the file exists but you don't want to use it and no I/O access or disposition processing will take place. For example, the DUMMY parameter can be useful when testing and is used in the IEBGENER utility on the SYSIN card.

The DYNAM parameter indicates that the resource can be held for reuse.

For additional information on positional parameters in DD statements, check your IBM JCL manual.

❷ **Keyword parameters:** The keyword parameters most commonly used are:

- DCB
- DDNAME
- DISP
- DSNAME
- LABEL
- MODIFY
- SPACE
- SYSOUT
- UNIT
- VOLUME

Keyword parameters will be discussed in the next issue.

Remember: Everything has its limits. The "powers that were" set a limit on the maximum number of DD statements allowed per job step: 1635. So, when the system finds that sixteen-hundred and thirty-sixth DD statement within the same job step — your JCL just crashed! ■

Academic HDS Mainframe Now Accessible by Telnet

by Billy Barron, VAX/Unix Systems Manager (BILLY@UNTVAX or BILLY@VAXB.ACS.UNT.EDU)

It is now possible to Telnet to the Academic Mainframe to use the MUSIC, CMS, or Academic COMPLETE operating systems. The Internet addresses are 3270.ACS.UNT.EDU (129.120.1.200) and 3271.ACS.UNT.EDU (129.120.1.201). The access is limited to using Telnet into the Mainframe (no FTP, SMTP, or outgoing Mainframe Telnet). The commands to access the mainframe are TELNET 3270.ACS.UNT.EDU or TELNET 3271.ACS.UNT.EDU.

Using Telnet from the VAX to the mainframe requires that a control character, such as CTRL-Z, be pressed after the session has been created to get the TERMINAL TYPE prompt. However, for performance reasons, the Computing Center highly recommends that Sytek users continue to CALL 3270 from the # prompt.

MS-DOS users using a version of NCSA Telnet 2.2D or earlier MUST contact me at 565-2324 or by Electronic Mail before attempting to use the mainframe via this method. Failure to do so CAN cause serious ethernet problems.

This is a new system and may potentially still have some minor bugs to beworked out. If you have any problems, contact Academic Computing Services (ISB 119, 565-2324).■

The Two Rules for Success in Life

❶ Don't tell people everything you know.

From rec.humor.funny, submitted by Dan_Bloch@transarc.com

UNT Upgrades WAN Link to T-1

By Billy Barron, VAX/Unix Systems Manager (BITNET: BILLY@UNTVAX)

The Wide Area Network circuit to the University of Texas at Dallas which carries our BITNET, Internet, Usenet, and THENET traffic was upgraded at the beginning of the October. In the past, this circuit was an analog 9600 baud leased line. This line has been extremely overloaded for the past few months.

The new circuit is a digital T-1 circuit. The speed of this T-1 circuit is 1.536 Mbps (Megabits per second). This is an improvement of 15900% in performance. We should have enough bandwidth to support our needs for a long time.

On tests, we have seen improvements of 200% to 5000% on FTPs. TELNET, SET HOST, and SEND responsiveness is infinitely better than in the past. However, in some cases, TELNET, SET HOST, and SEND will still be slow, but the reason will be a bottleneck on the remote end instead of our end of the connection. MAIL, file, and Usenet backlogs will also clear up much more quicly now.

In the future, other protocols, such as Novell Netware, will run across this circuit, too. Also, some researchers around campus have discussed using this link for wide area networking research. ■

MEDNEWS Serchable as an Online Database

According to David Dodell, Editor of MEDNEWS, a medical news list on BITNET, is being set up as a database. For more information, send mail to **listserv@vm1.nodak.edu** with the message info database as the first line of text.■

Improvements to the 565-3300 Dialup Lines Scheduled

by Billy Barron, VAX/Unix Systems Manager (BITNET: BILLY@UNTVAX)

In November 21st, the 565-3300 (Denton 2400 baud) dialup lines will be converted from the Sytek Localnet 20 devices to the new Hughes LAN Systems Terminal Servers. These terminal servers support three protocols: Sytek Localnet 20, LAT, and TCP/IP.

After the switch-over, users of the 565-3300 system should call in at 7 data bits, space parity, and 1 stop bit. Some terminals and terminal packages do not support 7-S-1. On these devices, 8 data bits, no parity, and 1 stop bit should work. **Note:** you can use the 7-S-1 setting before the conversion takes place. Consult the article "Recommendations For Communication Settings" on page 16 for more information.

All the existing Sytek commands will continue to work. However, the method by which some of these commands are handled are different. For example, **CALL DEC** no longer uses the Localnet 20 protocol to the VAX. It utilizes the LAT protocol over Ethernet. **CALL 3270** utilizes TCP/IP to connect you to the 7171 protocol converter again over Ethernet. These changes reduce the load on our broadband system and also give you faster response due to less network delays. Following is a list of the valid CALL commands and descriptions:

CALL 3270 or **CALL VM**	Connects to mainframe via TCP/IP
CALL 3271	Connects to mainframe via Sytek Localnet 20 (use when all TCP/IP ports on the mainframe are being used)
CALL DEC or **CALL VAX**	Connects to VAX via LAT (unlimited ports)
CALL 780	Connects to Computer Science Sequent via TCP/IP (unlimited ports)
CALL 3000,**CALL LIBRARY**, or **CALL LIB**	Connects to Library HP 3000 via Sytek Localnet 20
CALL 3B2	Connects to the 3B2 system
CALL tcp-ip-address	Connects you via TCP/IP to any UNT machine that supports incoming TELNET

The 565-3300 dialup lines will be down on Wednesday, November 21st starting at 8 am till about noon and possibly could be down longer if problems occur. During the time of this upgrade, the 565-3461 (9600/2400 baud) and 565-3499 (1200 baud) lines will both remain available. Users of the 565-3300 rotor should use one of these other numbers while we are upgrading. ■

NT Statpak continued from page 13.

```
//IDnn JOB  ... a valid JOB statement
//    EXEC STAT01,PROGM=ST008
  title line
  parameter line
  format line
```

Further information on the input set-up and fuller descriptions of the programs is documented in the NT Statistical User's Guide, Version III, September, 1975, or is available from George Morrow in Academic Computing (565-2324). ■

Recommendations for Data Communication Settings

by CR Chevli, Data Communications Analyst and Billy Barron, VAX/Unix Systems Manager (BITNET: BILLY@UNTVAX)

It is now recommend that you use 7 data bits, space parity, and 1 stop bit (7-S-1) when communicating to academic UNT host systems (such as the VAX and the HDS Mainframe). Many machines that do not directly support 7-S-1 actually implement 8 data bits, no parity, and one stop bit (8-N-1) as 7-S-1. Therefore, on those systems, use 8-N-1. In the past, people had to switch settings when using different systems. The technical reasons why are somewhat complex.

Setting parity on communication devices is sometimes frustrating and often exhaustive because of inherent inconsistencies in its implementations on different systems. A particular parity setting on a terminal (or PC) may work fine with a variety of settings on one host system and not as well on the other. The main reason for this unpredictable behavior is an inconsistent implementation of parity on terminals, hosts and communication modems interconnecting these devices.

The selection of an appropriate parity for a system involves identifying the number of data bits (5-8) and parity bit (even or odd). When all eight bits are used for data, parity cannot be selected and is assumed none. Most systems use seven data bits with even, odd or no parity (don't care). The parity is said to be even when the number of 1's per byte (including the parity bit) is even. The parity is said to be odd when the number of 1's per byte is odd. Thus, the implementation of even and odd parity is straight forward. The implementation of no parity however, is undefined since the parity bit may be 0 (even), 1 (odd) or none (assumed).

To overcome inconsistent implementation of no parity some systems support mark and space options. The parity is said to be mark when the parity bit is forced 1. The parity is said to be space when the parity bit is forced 0. Thus, the implementation of mark and space parity overcomes inconsistencies when seven data bits are used. When no parity is used most systems set and/or expect the parity bit to be 0. Communication with such systems require setting space option on terminal device. Conversely, mark option may be necessary when the system sets and/or expects the parity bit to be 1. ■

Metro Dial-in Line Changes

By Dave Molta, Director of Academic Computing (BITNET: MOLTA@UNTVAX)

One of the most essential services provided by the Computing Center to the academic computing community is dial-in modem access to the UNT campus network from the Dallas-Ft.Worth metroplex. This service, which allows faculty and staff who live in the metroplex to access mini and mainframe computer systems from their homes, has traditionally suffered from serious reliability problems. The reasons for these reliability problems have been discussed in great detail in past issues of *Benchmarks* (see "Did you ever call 6006 to find that . . . The Metro Line Sleeps Tonight? — April/May 1990, pp. 12-17), but the end result has been a great deal of frustration among the user community. In response to these problems, the Computing Center has implemented a new system that will expand the number of lines available while at the same time improving overall system reliability.

Continued on page 20

NETLIB Public Domain Mathematical Software

This article is excerpted from an article by the same name that appeared in the February, 1990 issue of the University of Minnesota Academic Computing Services Newsletter — ACS. Elements have also been incorporated from the NETLIB Index.

NETLIB is an electronic mail system for distributing a wide range of public domain mathematical software. It contains software for numerical linear algebra, linear programming, nonlinear optimization, curve fitting, special functions, fast Fourier transforms, the numerical solution of ordinary and partial differential equations, and more.

All of the NETLIB routines come in source code form and require the appropriate compiler (usually FORTRAN). Keep in mind that, though the routines are free of charge, they come with no guarantee. However, much of the code is nationally recognized for its quality.

Some types of problems can occur when using the routines. We recommend that you carefully test and check each routine. In particular, look for machine constants in the codes. Machine constants for a CRAY might produce incorrect results when used on an IBM PC. Also, a number of routines exist for solving some types of problems, and a user might not know which one is best.

The default for all subroutines is double precision. To get single precision, prefix the library name in your request with an "S" (We only recommend single precision on CYBERs, CRAYs, or similar machines that have a large single precision word). If the library only has one precision, that's what you will be sent.

When you access NETLIB, don't ask for an entire library such as LINPACK. Libraries are much too large to send.

Instead, ask for specific routines. NETLIB will send each routine and all routines it calls. Remember that ACS has the LINPACK, EISPACK, MINPACK, and QUADPACK libraries on the VAX VX system, and they are also in CMLIB on the ENCORE UX system.

Accessing NETLIB

The index files and the software itself are available from NETLIB by sending requests in the form of electronic mail addressed to: NETLIB@ORNL.GOV

The requests are one-line commands that can be the subject part of a mail message or can be the mail message itself. NETLIB interprets the command, executes it, and sends you a mail message response.

Background information on NETLIB, see "Distribution of Mathematical Software Via Electyronic Mail" by Jack Dongarra and Eric Grosse in Communications of the *ACM* (May, 1987), pp. 403-407. Following are some typical commands to NETLIB.

Examples of NETLIB Commands and Their Meanings

Comand	Requests
SEND INDEX	Index listing of all available software.
SEND INDEX FROM *library*	Index of routines within a specific library — e.g. **SEND INDEX FROM EISPACK**
SEND *routine* **FROM** *library*	Routine contained in a particular library — e.g., **SEND DGECO FROM EISPACK**

Continued on page 18

THE BITNET CONNECTION

By Dr. Philip Baczewski, BITNET INFOREP (BITNET: AC12@UNTVM1)

This Column is a continuing feature of ***Benchmarks*** *intended to present news and information on various aspects of the BITNET wide area network.*

Following the Rules...

When you are driving down the road, you hope that other drivers are following the rules: everyone driving the correct direction on the correct side of the street is always nice; it's helpful when those that see red lights come to a stop at an intersection (although, as many of us know, this is not always the case); and, it's nice that using your headlights at night is not an option.

Just like there are rules of the road, BITNET users must abide by certain rules. These rules are in the form of usage guidelines set by the board of the Corporation for Research and Educational Networking (CREN), the governing body for the BITNET and CSNET wide area networks. These rules are common sense, mostly. BITNET's reason for existence is to facilitate the exchange of information among academic institutions. Activity which runs counter to that purpose is obviously discouraged. Common sense dictates that no one's BITNET activity should interfere with an individuals use of BITNET or the BITNET communities's access to the network.

What follows is the CREN acceptable use policy for the BITNET and CSNET networks. It is published here in its entirety. All BITNET users should read, become familiar with, and follow these guidelines, so that the network will be used in a responsible manner consistent with its mission. Now, about that driving...

Corporation for Research and Educational Networking Acceptable Use Policy

CREN networks are for the use of persons legitimately affiliated with CREN Member or Affiliate organizations, to facilitate the exchange of information consistent with the academic, educational and research purposes of its members. All individuals affiliated with CREN Member or Affiliate organizations are responsible for seeing that their communities are aware of these guidelines, and that the guidelines are followed, both in letter and in spirit.

CREN networks are, at the discretion of the institutions involved, open to use by students enrolled at participating CREN Member or Affiliate educational institutions.

Use of CREN networks shall:

- Be consistent with the purposes and goals of the networks
- Avoid interfering with the work of other users of the networks
- Avoid disrupting the network host systems (nodes)
- Avoid disrupting network services

Acceptable Use of the Networks

While the statement of the Acceptable Use Policy of the CREN Networks is clear in its intent, some examples may help users of the networks apply its principles in particular cases.

- Messages that are likely to result in the loss of recipients' work or systems are prohibited.
- CREN networks are not to be used for commercial purposes, such as marketing, reselling band with, or business transactions between commercial organizations.
- Advertising is forbidden. Discussion of a product's relative advantages and disadvantages by users of the product is encouraged. Vendors may respond to questions about their products as long as the responses are not in the nature of advertising.
- CREN networks may be used for the provision of services which support the needs and purposes of the CREN networks, and for which a charge is made, if the network is an optional mechanism for provision of this service for which no additional charge is made, and as long as the use of the service is consistent with the band width of the network and the forwarding hosts. Providers of such information may be non-profit or for-profit organizations.
- Any communication which violates existing laws is not allowed.

Users of CREN networks are Expected to be Responsible In Their Use

- "Chain letters," "broadcasting" messages to lists or individuals, and other types of use which would cause congestion of the networks or otherwise interfere with the work of others are not allowed.
- Bitnet files will be limited to sizes determined and reviewed periodically. (Note: The current limit is 300,000 bytes per file transmitted. *ed. note: this size is approximately equivalent to a 3750-line file whose lines are each 80 characters long.)*

LIST of the Month

Each month we will highlight one of the BITNET LISTSERV Special Interest Group (SIG) mailing lists.This month's list...

EPID-L@QUCDN

Coordinator: Robert C. James (JAMESRC@QUCDN)
EPID-L: is devoted to topics of Epidemiology and Biostatistics. Plant, animal and human researchers are invited to join. Methodological and statistical issues are of primary interest, as well as comment and evaluation of current research.

Consistent with this issue's theme, this month's list centers on a statistical topic. If you are interested in joining the above discussion group, send the following command as an interactive or mail message to ***LISTSERV@QUCDN:*** **SUB EPID-L your full name**. *Be sure to include your full first and last name when you subscribe.*

CREN Members or Affiliates are expected to take reasonable measures (given the constraints of technology and management) to ensure that traffic using gateways between CREN networks and other networks conforms to these guidelines.

Final authority for CREN acceptable use policies lies with the CREN Board. It is the responsibility of member representatives to contact the CREN Board, in writing, regarding questions of interpretation. Until such issues are resolved, questionable use should be considered "not acceptable." ■

NETLIB continued from page 17

Comand	Requests
FIND *keyword*	Listing of all routines conntaining the "keyword" — e.g., FIND EIGNEVALUE will give you a listing of all routines in the data base that contain the keyword EIGNEVALUE

Following is a list and brief description of the libraries, gleaned from the NETLIB Index.

A Quick Summary of Contents

- **a** - approximation algorithms (almost empty, but soon to grow)
- **alliant** - set of programs collected from Alliant users

- **apollo** - set of programs collected from Apollo users
- **benchmark** - various benchmark programs and a summary of timings
- **bihar** - Bjorstad's biharmonic solver
- **bmp** - Brent's multiple precision package
- **cheney-kincaid** - programs from the text Numerical Mathematics and Computing.
- **conformal** - Schwarz-Christoffel codes by Trefethen; Bjorstad+ Grosse
- **core** - machine constants, Level 1, 2, and 3 BLAS
- **domino** - communication and scheduling of multiple tasks; Univ. Maryland
- **eispack** - matrix eigenvalues and vectors
- **elefunt** - Cody and Waite's tests for elementary functions
- **errata** - corrections to numerical books
- **fishpack** - separable elliptic PDEs; Swarztrauber and Sweet
- **fitpack** - Cline's splines under tension
- **fftpack** - Swarztrauber's Fourier transforms
- **fmm** - software from the book by Forsythe, Malcolm, and Moler fn - Fullerton's special functions
- **gcv** - Generalized Cross Validation
- **go** - "golden oldies" gaussq, zeroin, lowess, ...
- **graphics** - ray-tracing
- **harwell** - MA28 sparse linear system
- **hompack** - nonlinear equations by homotopy method
- **itpack** - iterative linear system solution by Young and Kincaid
- **lanczos** - Cullum and Willoughby's Lanczos programs
- **laso** - Scott's Lanczos program for eigenvalues of sparse matrices
- **linpack** - gaussian elimination, QR, SVD by Dongarra, Bunch, Moler, Stewart
- **lp** - linear programming machines - short descriptions of various computers
- **matlab** - software from the MATLAB user's group
- **microscope** - Alfeld and Harris' system for discontinuity checking
- **minpack** - nonlinear equations and least squares by More, Garbow, Hillstrom
- **misc** - everything else
- **na-digest** - archive of mailings to NA distribution list
- **napack** - numerical algebra programs
- **ode** - ordinary differential equations
- **odepack** - ordinary differential equations from Hindmarsh
- **paranoia** - Kahan's floating point test

pchip - hermite cubics Fritsch+ Carlson

- **picl** - portable instrumented communication library for multiprocessors
- **pltmg** - Bank's multigrid code; too large for ordinary mail
- **polyhedra** - Hume's database of geometric solids
- **port** - the public subset of PORT library
- **pppack** - subroutines from de Boor's Practical Guide to Splines
- **quadpack** - univariate quadrature by Piessens, de Donker, Kahaner
- **slam** - typesetting macros for SIAM journal format
- **slatec** - machine constants and error handling package from the Slatec library
- **sparse** - a set of c codes for sparse systems of equations
- **sparspak** - George + Liu, sparse linear algebra core
- **specfun** - transportable special functions
- **toeplitz** - linear systems in Toeplitz or circulant form by Garbow
- **toms** - Collected Algorithms of the ACM vfftpk - A vectorized package of Fortran for fast Fourier transform
- **y12m** - sparse linear system (Aarhus)

A Bit More Detail

The first few libraries here are widely regarded as being of high quality. The likelihood of your encountering a bug is relatively small; if you do, we certainly want to hear about it!

- **CORE** — Machine constants (i1mach,r1mach,d1mach), blas (level 1, 2 and 3)
- **EISPACK** — A collection of Fortran subroutines that compute the eigenvalues and eigenvectors of nine classes of matrices. The package can determine the eigensystems of complex general, complex Hermitian, real general, real symmetric, real symmetric band, real symmetric tridiagonal, special real tridiagonal, generalized real, and generalized real symmetric matrices. In addition, there are two routines which use the singular value decomposition to solve certain least squares problems. Developed by the NATS Project at Argonne National Laboratory. (d.p. refer to eispack, s.p. refer to seispack)
- **FFTPACK** — A package of Fortran subprograms for the Fast Fourier Transform of periodic and other symmetric sequences. This package consists of programs which perform Fast Fourier Transforms for both complex and real periodic sequences and certian other symmetric sequences. Developed by Paul Swarztrauber, at NCAR.
- **FISHPACK** — A package of Fortran subprograms providing finite difference approximations for elliptic boundary value problems. Developed by Paul Swarztrauber and Roland Sweet.
- **FNLIB** — Wayne Fullerton's special function library. (single and double)
- **GO** — Golden Oldies: routines that have been widely used, but aren't available through the standard libraries. Nominations welcome!
- **HARWELL** — Sparse matrix routine MA28 from the Harwell library. From Iain Duff
- **LINPACK** — A collection of Fortran subroutines that analyze and solve linear equations and linear least squares problems. The package solves linear systems whose matrices are general, banded, symmetric indefinite, symmetric positive definite, triangular, and tridiagonal square. In addition, the package computes the QR and singular value decompositions of rectangular matrices and applies them to least squares problems. Developed by Jack Dongarra, Jim Bunch, Cleve Moler and Pete Stewart. (all precisions contained here)
- **PPPACK** — Subroutines from: Carl de Boor, A Practical Guide to Splines, Springer Verlag. This is an old version, from around the time the book was published. We will install a newer version as soon as we can.
- **TOMS** — Collected algorithms of the ACM. When requesting a specific item, please refer to the Algorithm number.

For a complete description of the libraries available from NETLIB, send mail — as mentioned at the beginning of this article — to get the NETLIB Index. ■

Metro continued from page 16

The metro dial-in system that is being replaced consists of a complex set of communications devices housed at both UNT and the Texas College of Osteopathic Medicine (TCOM) in Ft. Worth. In addition to being extremely expensive, the old system suffered from multiple points of failure. When failures did occur, it was very difficult to correct problems due to the absense of after-hours support staff at TCOM. Despite our best efforts to maintain reliability, we were never able to achieve a level of service that users could depend on.

The new system that is scheduled to go into production on November 21 has been made possible by a number of recent changes in our campus network. The most significant of these changes are the implementation of an Ethernet network on campus and the upgrade of our wide area network (WAN) connection into the international Internet. These two changes allow us to take advantage of new technologies that provide for reliable communications services over extended geographic areas.

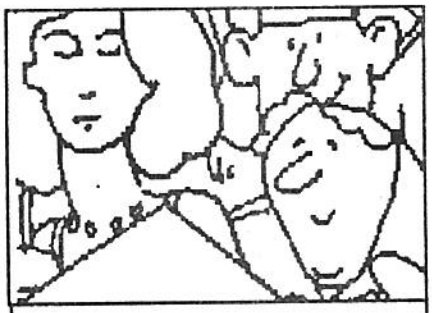
The new system will consist of 16 Multi-Tech 2400 bits per second (bps) modems supporting Microcom Network Protocol (MNP) level 5 compression and error correction. When accessed from another modem that also supports MNP (thes modems are available for as little as $69 at Soft Warehouse in Dallas), effective communications throughput levels of up to 4800 bps can be achieved. Under the provisions of an inter-agency contract, these modems will be housed at and maintained by the University of Texas at Arlington's (UTA) Computing Center. Housing these modems at UTA provides us with three important benefits. First, since there is no premium charge for a metro-line in Arlington, we have been able to reduce the cost per line, thus allowing for the expansion of the number of metro lines from 11 to 16. Second, since UTA maintains after-hours support staff, we hope that problems that occur at night and on weekends will be corrected much more quickly. Finally, since the communications between UTA and UNT will take place over circuits that are used for many other essential services and are monitored 24 hours per day, we feel that the overall reliability of the connection between the metroplex and UNT will be enhanced.

From the user's perspective, there will be several changes in how UNT systems are accessed from the new metro lines. These changes are attributable primarily to the fact that the new system is based on the TCP/IP communications protocol rather than the older Sytek system that was previously used. At the time of this writing, all of the details related to changes in access commands have not been determined, but these details will be posted on VAX, MUSIC, and CMS News. In addition, a handout will be made available in ISB 119 by the time the new circuits come on-line. Note also that the existing metro-line services (429-6006 & 429-9314) will be maintained until the end of the Fall semester.

We are hopeful that these changes will result in an improvement in this essential service. Be sure to check the News on all academic host systems for further information as these new lines become available. ■

^<@<.@*	hat less at less point at star
}"_#|	backbrace double base pound space bar
-@$&/_%	dash at cash and slash base rate
|(@|=>	wow open tab at bar is great
;'+$?^?	semi backquote plus cash huh DEL
,#"~|)^G	comma pound double tilde bar close BEL

From rec.humor.funny, submitted by davez@ashtate.a-t.com



BENCHMARKS FORUM

BENCHMARKS FORUM is intended to serve as a vehicle for answering questions that may be of general interest to the user community. If you have a question, please send electronic mail to the Benchmarks editor (BITNET: AS04@UNTVM1) *or write it down and drop it by the Computing Center. We will try to answer it in the next issue.*

Question: *My major professor wants me to get contrasts with my repeated-measures analysis, what does she mean?*

Answer: Good question. This answer is excerpted from an article entitled "Obtaining Contrasts for Repeated-Measures Designs," by Priscilla Hancock (BITNET: STATS@UTADNX) that appeared in the University of Texas at Austin *Computation Center Newsletter* (5-Mar-90).

Often a researcher not only wants to determine whether there are differences across the levels of a within-subject factor but also wants to test specific hypotheses about the pattern of those differences. For example, if you wanted to study the changes in bone density with age, in women over the age of 55, you would measure the bone density of women when they are 55, 60, and 65 years of age. Suppose, however, that you also wanted to determine whether those bone-density changes followed a linear or a quadratic pattern. A polynomial contrast procedure would be appropriate for making that determination.

Using SAS, the appropriate procedure to specify a repeated-measures analysis is PROC GLM with the REPEATED statement, with which you can specify the following: CONTRAST, POLYNOMIAL, HELMERT, MEAN, and PROFILE. CONTRAST tests each individual level of the within-subject factor against the last level of the factor.

POLYNOMIAL generates orthogonal polynomial contrasts. HELMERTcompares each level of the factor with the mean of the following levels. PROFILE compares adjacent levels of the factor. The following SAS code performs a repeated-measures analysis with a polynomial contrast specified for the age variable:

```
PROC GLM;
MODEL BD55 BD60 BD65 = /
NOUNI;
REPEATED AGE 3 POLYNO-
MIAL / SUMMARY NOM NOU;
RUN;
```

You should use the SUMMARY option since it prodouces analysis of variance tables for each contrast defined by the repeated measure. The NOM and NOU options supress the multivariate and univariate results, thus keeping information redundant with the SUMMARY output from being printed.

If you prefer to use SPSS-X instead of SAS, the appropriate command to use is MANOVA. The WSFACTOR subcommand defines the within-subject variables. The CONTRAST subcommand specifies the specific contrasts to be tested. The following types of contrasts may be specified on the CONTRAST statement: DEVIATION, DIFFERENCE, HELMERT, SIMPLE, REPEATED, POLYNOMIAL, and SPECIAL.

DEVIATION compares deviations from the grand mean with the deviation for the last level being omitted. DIFFERENCE compares the levels of a factor with the mean of the previous levels. HELMERT compares the levels of a factor with the mean of the subsequent levels. SIMPLE compares each level with the last level of the factor. POLYNOMIAL generates orthogonal polynomial contrasts (linear, quadratic, etc.). REPEATED compares the adjacent levels of a factor to each other.

The SPECIAL contrast enables you to specify your own set of contrasts. However, when contrasts are being specified for a within-subject factor, only orthogonal contrasts such as POLYNOMIAL contrast are truly available. Non-orthogonal contrasts, such as DEVIATION and SIMPLE, are orthonormalized prior to the repeated-measures analysis, and the parameter estimates obtained are not for the requested contrast. Therefore, you should request only orthogonal contrasts for repeated-measures designs and should print the transformation matrix as an additional check.

The following SPSS-X code performs a repeated-measures analysis with a polynomial contrast specified for the age variable:

```
MANOVA BD55 BD60 BD65
  /WSFACTORS = AGE (3)
  /CONTRAST (AGE) =
  POLYNOMIAL
  /WSDESIGN
  /PRINT = PARAMETERS
   (ESTIM) TRANSFORM
  /DESIGN
```

The PRINT subcommand requesting PARAMETERS (ESTIM) is required to test that the true value of the parameter of the contrast is 0. Otherwise, no significance tests for contrasts will be printed. The TRANSFORM keyword on the PRINT subcommand requests printing of the transformation matrix used to generate the parameter estimates.

For more information about how to specify repeated-measures designs in SAS or SPSS, contact Panu Sittiwong, Phanit Laosirirat, or George Morrow in Academic Computing Services (817-565-2324). ■

Call For Papers

Postmodern Culture: An Electronic Journal Of Interdisciplinary Criticism, is inviting the submission of works in progress, book reviews, scripts, fiction, and essays on:

- Feminism and postmodernism
- Plagarism
- Prestige
- Race and postmodernism
- Re-reading the Frankfurt school
- Violence
- Children's culture (inluding brief essays by young children
- New fiction and poetry
- Popular Culture
- Postmodern iconography
- Reproduction & the family
- Technology and Gender

Submissions or requests for information: PCM@NCSUVM

Benchmarks Reader/User feedback is encouraged. Send all letters, suggestions,etc to(AS04@UNTVM1), FAX 817-565-4060 or to the *Benchmarks* Editor at:

Academic Computing Services
University of North Texas
Computing Center
P.O. Box 13495
Denton,Texas 76203

Converting Foreign Files to SAS PC and SPSS PC Data Sets

By Phanit Laosirirat, Academic Computing Services Consultant (BITNET: AC44@UNTMUSIC)

This is a revised and expanded version of an article that appeared in the May/June 1989 issue of ***Benchmarks*** *(pp. 15-16).*

Data for statistical analysis can come from a number of sources. Many times a special data file for analysis on the PC is created by entering the information from the computer keyboard or by compiling it on a mainframe and down-loading the file to your PC. Sometimes, however, the data to be analyzed comes from another PC program used for manipulating data such as a spreadsheet or database program. Both SAS-PC and SPSS-PC are capable of accepting data from various spreadsheet and database programs. What follows are some tips to help you convert such files for statistical analysis.

One Special Requirement

Any foreign file that you plan to convert to either a SAS or SPSS data set should be in a tabular form; that is, all items in a given column should represent the same type of data (character or floating point). After converting, each row of the foreign file becomes an observation in the SAS or SPSS data set.

Foreign Files That Can Be Converted

SPSS PC can convert a number of original foreign file types directly into a SPSS PC data set. A foreign file can be in any of the following forms:

Foreign file type	File Extension Keyword
1-2-3 Release 2.0	WK1
1-2-3 Release 1A	WKS
Symphony	WRK
Multiplan (symbolic format only)	SLK
All dBASE	DBF
dBASE-II	DB2
dBASE-III, dBASE-III Plus	DB3

SAS PC can convert the following foreign file types:

- 1-2-3 Release 2.0 (Data Interchange Format (DIF) only)
- 1-2-3 Release 1A (Data Interchange Format (DIF) only)
- VisiCalc (Data Interchange Format (DIF) only)
- Any spreadsheet file that is in DIF format
- dBASE-II version 2.4
- dBASE-III version 1.0
- dBASE-III version 1.1.

SPSS PC Statements For File Conversion

SPSS PC uses the **TRANSLATE** command to convert a foreign file to an SPSS PC data set. Or, one can use the **TRANSLATE** command to convert an SPSS PC data set back to a foreign file. For example:

```
TRANSLATE FROM='PROJECT.WK1'
    /TYPE=WK1
    /RANGE=A1..J100.
```

In this example, **TRANSLATE** creates an active file from the 1-2-3 file PROJECT.WK1. The **TYPE** subcommand indicates the format of a foreign file. TYPE is optional if the file extension named on the FROM subcommand corresponds to the format keyword. The **RANGE** subcommand translates a specified set of cells from a spreadsheet file. For example:

```
TRANSLATE TO='PROJECT.WK1'
    /TYPE=WK1.
```

Here, **TRANSLATE** creates a 1-2-3 file from a SPSS PC active file.

The **TRANSLATE** command also has several other subcommands available that allow you to tailor your converted file to the format you want for the destination file. See the SPSS PC manual for details on **TRANSLATE**.

A caution for Lotus users: By default, SPSS uses the column letters as variable names (A, B, C,....., ZZ). SPSS also takes the first row format as its variable format after conversion. However, many Lotus users normally put the field labels on the first row of the spreadsheet. These labels or names can be transferred as SPSS PC+ variables by using the **FIELDNAMES** Subcommand.

Another problem usually occurs something like this: in many spreadsheet files, after the field label row we usually put a blank row before the first row of data. When SPSS starts reading the data, it begins from the line immediately below field label row and since it is blank, SPSS assigns a system-miss-

ing value to every column of the first row. By default, SPSS reads this system-missing value as character value.

As mentioned above, the format of the variables in the first row will be the format of the those variables for all subsequent rows. After conversion, you will end up with all the numeric variables missing. **Remember**: if the first row is blank, SPSS reads every column as a character column even it is not character, so before converting it is best to eliminate a blank row occurring after a row with field labels.

SAS PC Statements For File Conversion

SAS PC uses two different procedures for file conversion:

1. **PROC DIF** for converting Data Interchange Format (DIF) files;
2. **PROC DBF** for converting dBASE II and dBASE III files.

\PROC DIF is used when you want to convert a DIF format file to a SAS data set, however, DIF is not the default format in most of the programs mentioned above. For example, the default format of a LOTUS 1-2-3 file is not DIF. If you want to convert a 1-2-3 file into a SAS PC data set, you have to use the LOTUS translate facility to translate the WK1 format to the DIF format before you do any file conversion (consult your LOTUS manual before you do this). Once you have saved your Lotus file as a DIF file, you can convert it into a SAS PC data set using a method similar to the following:

```
FILENAME DATAIN 'C:\EMPLOYEE.DIF';
LIBNAME DATAOUT 'C:\SASDATA';
PROC DIF DIF=DATAIN
OUT=DATAOUT.EMPLOYEE;
RUN;
```

In the example above, a DIF file named EMPLOYEE.DIF is converted to a SAS data set. FILENAME and LIBNAME statements are used to specify a file reference and a library reference. FILENAME tells SAS where to get the a DIF file and to use DATAIN as a reference to C:\EMPLOYEE.DIF. LIBNAME tells SAS to use C:\SASDATA directory to save the output SAS data set and to use DATAOUT as directory reference. Your output SAS data set will be saved in C:\SASDATA directory under the name EMPLOYEE.SSD.

The process of converting dBASE files is similar, however, these files do not need to be saved in an intermediate format before conversion. The following example shows the use of **PROC DBF** to read a dBASE file into a SAS PC data set:

```
FILENAME DATAIN 'C:\EMPLOYEE.DBF';
LIBNAME DATAOUT 'C:\SASDATA';
PROC DBF DB2=DATAIN
OUT=DATAOUT.EMPLOYEE;
RUN;
```

In the above example, a dBASE II file named EMPLOYEE.DBF is convert to a SAS data set.

```
FILENAME DATAIN 'C:\EMPLOYEE.DBF';
LIBNAME DATAOUT 'C:\SASDATA';
PROC DBF DB3=DATAIN
OUT=DATAOUT.EMPLOYEE;
RUN;
```

Here, a dBASE III file named EMPLOYEE.DBF is converted to a SAS data set.

One can also convert a SAS data set to a DIF or a dBASE file. For example:

```
FILENAME DATAOUT
'C:\LOTUS\EMPLOYEE.DIF';
LIBNAME DATAIN 'C:\SASDATA';
PROC DBF DB2=DATAOUT
DATA=DATAIN.EMPLOYEE;
RUN;
```

In this example, a SAS data set, DATAIN.EMPLOYEE, is converted to a DIF file called EMPLOYEE.DIF, and it is saved on the C drive in the LOTUS directory.

Third Party Software For Data Conversion

Academic Computing Services has a third party program that can do the file conversion for you without having to write a SAS or a SPSS program. This third party software is called **DBMS/COPY**. DBMS/COPY is able to translate and transfer data between different database management systems, spreadsheets, statistical and other application packages. A few of the packages that DBMS/COPY is able to translate to and from are as follows: Lotus 1-2-3, Symphony, Quattro, dBASE III, Oracle, Paradox, Rbase, BMDP, Gauss, SAS, SPSS, StatPac, and Systat. For example, you can translate your data from SAS to Lotus 1-2-3 or from Lotus 1-2-3 to SAS.

DBMS/COPY is only available on the PCs in the ISB 110 lab. DBMS/COPY syntax is used with a straightforward command. You must exit the menu screen to the DOS prompt and you will be ready to use DBMS/COPY.

Using DBMS/COPY

1. First insert your floppy disk containing your source file into drive A:.
2. Change the default directory to A: drive (type **A:** at the DOS prompt).
3. At the prompt, issue the following command.

```
A:> dbmscopy 'source.ext' 'target.ext'
```

The extension is very important. It must be specified so that DBMS/COPY can identify the source database system and the target database system. Each database has its own extension. Lotus 1-2-3 has **wk1** as its extension. SAS PC uses **ssd** as its extension.

Examples

- Translate a Lotus 1-2-3 file to a SPSS file

```
A:> dbmscopy ltusdata.wk1 spssdata.spss
```

After the translation, an SPSS data, **SPSSDATA.SYS**, will be saved on drive A.

- Translate a SAS PC file to a Lotus 1-2-3 file

```
A:> dbmscopy sasdata.ssd ltusdata.wk1
```

- Translate SAS to SPSS

```
A:> dbmscopy sasdata.ssd spssdata.spss
```

After the translation you will have an SPSS data, **SPSSDATA.SYS**, saved in drive A.

To translate an SPSS file to a different database, DBMS/COPY requires an SPSS file to have a file extension of .sys before it can be processed. If a different extension has been used, the file must be renamed to give it the .sys extension. You can accomplish this by using the DOS RENAME command. DBMS/COPY will recognize the .sys extension through the .spss extension. A different rule is applied to a SAS data set. To translate a database file to a SAS PC data set, you can use only A through Z alphabet as its name. However, this rule is not required to translate a SAS PC data set to other databases. The following command translates an SPSS data, **SPSSDATA.SYS**, to a SAS data set, **A.SSD**.

```
A:> dbmscopy spssdata.spss a.ssd
```

If you prefer another name to a single alphabet name, you can use SAS PC PROC DATASETS to rename the file. You cannot use DOS RENAME command to rename any SAS data set. This is the SAS PROC to rename the SAS data set.

```
LIBNAME SASIN 'A:\';
PROC DATASETS LIBRARY=SASIN
MEMTYPE=DATA;
 CHANGE A=SASDATA;
RUN;
```

After this procedure has been executed, **A.SSD** will be renamed to **SASDATA.SSD**.

If you have any questions about using any of these programs, please contact UNT Academic Computing Services at 565-2324. ■

PROCOMM Plus Available for Distribution

The University recently upgraded the Procomm software site license agreement to include Procomm Plus and the software package is now available at no cost for all faculty, staff and students. Please bring one **formatted** 5 1/4" or one 3 1/2" diskette to Microcomputer Support, in the Information Sciences Building (ISB) room 249/224. We are located on the North end of the Information Science building, second floor, the first door to left of the top stairway.

An installation guide will be handed out with the diskette. The software is in an archived format and instructions will be given to copy to another disk or hard disk in a usable format.

Currently, the Procomm Plus manual from the vendor is only available to faculty and staff if they provide Microcomputer Support with an IDO for $15.00 per manual. Pre-printed software IDO forms are available from the at the main office of the Computing Center located in the Information Sciences Building room 119 for your convenience or you may use a standard IDO form if you so desire. Please specify "Other" on the pre-printed form and indicate that your would like to purchase a Procomm Plus manual and deliver the signed IDO form to Microcomputer Support at ISB 224 to pick up your manual.

At the present time, students are not allowed to purchase manuals from the Computing Center. However, students may purchase the manuals directly from DataStorm for $15.00 plus $2.00 s/h. DataStorm accepts MasterCard, Visa, or personal check. Students may call in credit card orders to :

DataStorm Technologies, Inc
314-443-3282
Attn : Cherie Gerau, Marketing Assistant

Students paying by check, should use the following address. Be sure to specify that you are purchasing a Procomm Plus manual.

DataStorm Technologies, Inc.
3212 Lemone Blvd.
P.O. Box 1471
Columbia, MO 65205
Attn : Cherie Gerau

In addition, several third party books are available in area computer book stores. One such book, Using Procomm Plus by Que - $19.95, is available in the computer book section of the University Store located on the first floor of the Union Building. Other good sources for books about Procomm Plus are B. Dalton Books and Waldenbooks located in the Golden Triangle Mall. ■

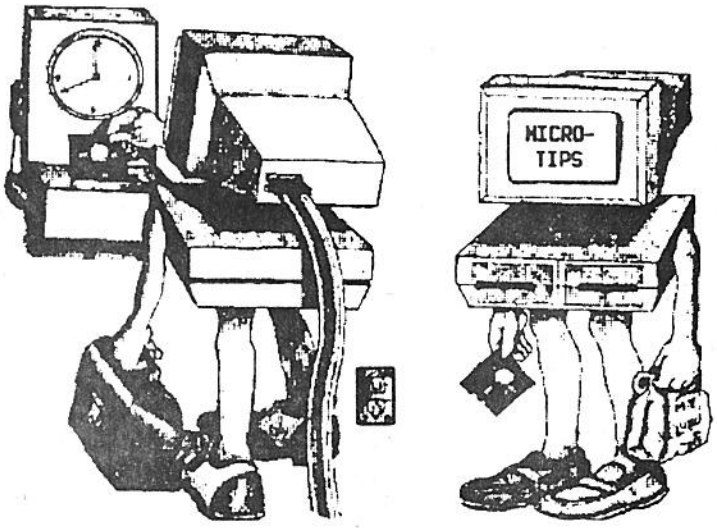
User Groups

On-Campus Groups

- **NT WordPerfect Users Support Group:** The WordPerfect-Users Support Group is open to any interested faculty, staff, or student who wishes to share information or ask questions about WordPerfect products supported by the Microcommputer Support section of Academic Computing Services. Meetings are held every third Friday of the month from 12 to 1 p.m. in Marquis Hall, Computer Lab & Information Center, Room 105. The next meeting of this users group will be **Friday, October 19.**
- **Database Support Group:** The Database Support Group is open to any interested faculty, staff, or student who wishes to share information or ask questions about DBase or RBase.
  Contact Marilyn Rice, Micricomputer Supprot (565-2316), or Ann Goodgame, English (565-4193) for more information.

Off-Campus Groups

- **Denton Area Macintosh User's Group (DAMUG):** If you are interested in Macintosh computers and want to learn more about them, you are invited to the Denton Area Macintosh Users Group meetings. The meetings are held at the Denton Senior Center, 509 N. Bell Avenue, the fourth Saturday of each month. The next meeting is **Saturday, October 27**, from 10:00 a.m. to 1:00 p.m.. Call 383-3268 for more information. ■



This column is intended to serve as a forum for sharing useful tips on making more productive use of microcomputers. If you have a tip that you feel may be of use to campus users, submit it to the ***Benchmarks*** *editor for possible inclusion in a future issue.*

Resetting Your Computer's Clock

This is modified from an article, "Standard Time is Returning — Don't Forget to Set Back Your Computer's Clock" that appeared in the October 1990 issue of the ***Berkley Computing Bulletin*** *(Volume 3, Number 10).*

Daylight savings time came to an end at 2:00 a.m. on Sunday, October 28. Chances are, you didn't think about resetting your computer's time. If so, you might want to consider resetting it now. If your computer doesn't have the correct time, the time stamps on all the files you create or modify will be wrong.

Resetting Your PC's Clock

If you have an original IBM PC or PC XT that has a clock board installed in it, you should follow the directions supplied with the software that came with the clock board.

If you have an IBM PC AT and you are running PC-DOS 3.2 or earlier, you will need to run the "Setup" program to reset the clock. The "Setup" program is on the "Diagnostics" disk that was supplied with the *Guide to Operations* manual. If you are using PC-DOS 3.3, use the TIME command to reset the clock.

If you have an IBM PS/2, the software for resetting the clock is on the "Reference Diskette" supplied with the *Quick Reference* manual. Consult your manual for details on how to run this software.

Resetting Your Macintosh's Clock

To reset your Macintosh's clock, select "Alarm Clock" from the Apple menu. Then click on the flag next to the time displayed on the right side of the window. Next select the clock in the lower left portion of the window. Now select the numbers in the hours place in the time. You can either type in the correct hour or you can click once on the downward-pointing arrow to the right of the time. Once the correct time is displayed, click on the flag again and close the window. ■

VAX System News

NBI Decommissioned

The Computer Sciences Department NBI computer system has been decomissioned. All class accounts formerly on the NBI have been moved to the Sequent. NBI individual account holders that wish to continue to use Unix may request a Sequent account through the Computer Sciences Department Office (GAB 320, 565-2767).

New PRT Qualifiers

The printing utility PRT has been updated to include several qualifiers to enhance printing. The new qualifiers are: /VT100, /PRINTER, /FILENAME, /FONT, and /FILING_NAME. These qualifiers are direct replacements for the questions that PRT asks you, and are in no way required: you can still use PRT the way you used to. For more information, see HELP PRT. ■

VAXCLUSTER USAGE STATISTICS

September Top Ten Programs: CPU Time Used

Program	Description	CPU Time	Percent of Total
1. User programs	Compiled Programs	18 20:14:04.54	76.3
2. NEWS	ANU News Utility	1 14:46:01.93	6.5
3. BACKUP	Disk Backups	0 09:28:26.33	1.6
4. SURFACE	Contour Plotter	0 08:55:13.20	1.5
5 NNTP_TCPWIN	News Transfer Utility	0 08:32:24.95	1.4
6. DISKEEPER	Disk Optimizer	0 07:06:52.66	1.2
7. EDT	Editor	0 06:44:28.27	1.1
8. MAIL	VMS Mail	0 05:47:03.26	1.0
9. MAIL SERVER	VMS Mail Server	0 05:43:41.98	1.0
10. MOPAC	Quantum Mechanics	0 05:21:23.09	0.9
Total		24 16:45:27.17	

September Top Ten Programs: Frequency of Runs

Program	Description	Number of Runs	Percent of Total
1. LOGINOUT	User login	73480	18.9
2. SET	VMS Utility	49627	12.8
3. DIRECTORY	VMS Utility	36457	9.4
4. User programs	Compiled Programs	36119	9.3
5. DELETE	VMS Utility	29752	7.7
6. EDT	Editor	17448	4.5
7. SYSLOGIN	User Login	15733	4.0
8. TYPE	VMS Utility	12089	3.1
9. MAIL SERVER	VMS Mail Server	11331	2.9
10. SEND	Bitnet Message Utility	10121	2.6
Total		388895	

The Best of the BBS

Edited by Mark Thacker,
VAX
Programmer/Operator
(Mark@UNTVAX)

*Welcome to the **Best of the BBS** column. This column highlights some of the more interesting and useful discussions on the UNT BBS. For those of you not familiar with the BBS, here is how to log into the UNT BBS.*

- *Sign-on by typing **CALL DEC** at the LAN prompt and then entering **BBS** as your Username at the VAX prompt.*
- *If you are already logged-on to the VAXcluster, type **BBS** at the **$** prompt.*

*The opinions expressed in this column do not necessarily reflect the views of Academic Computing Services or the Computing Center. Also, information in **Best of the BBS** has not been checked for accuracy.*

Hanging-Up From The BBS

#514 21-SEP-1990 14:52:51.35

Subject : Sign off

I have read in Benchmarks how to sign on to the BBS, and it works, because here I am (a statement of the obvious). How does one sign off after getting back to the "#" ??

#517 Reply to #514 21-SEP-1990 17:28:28.60

Subject : RE: Sign off

To exit from the LAN prompt (that # thingy), simply hang up. That's as far out as you can get from the system.

Continued on page 26.

Speeding-Up Loan Application Processing at Financial Aid

By Mahshid Grooms, Student Services Data Systems Team Leader

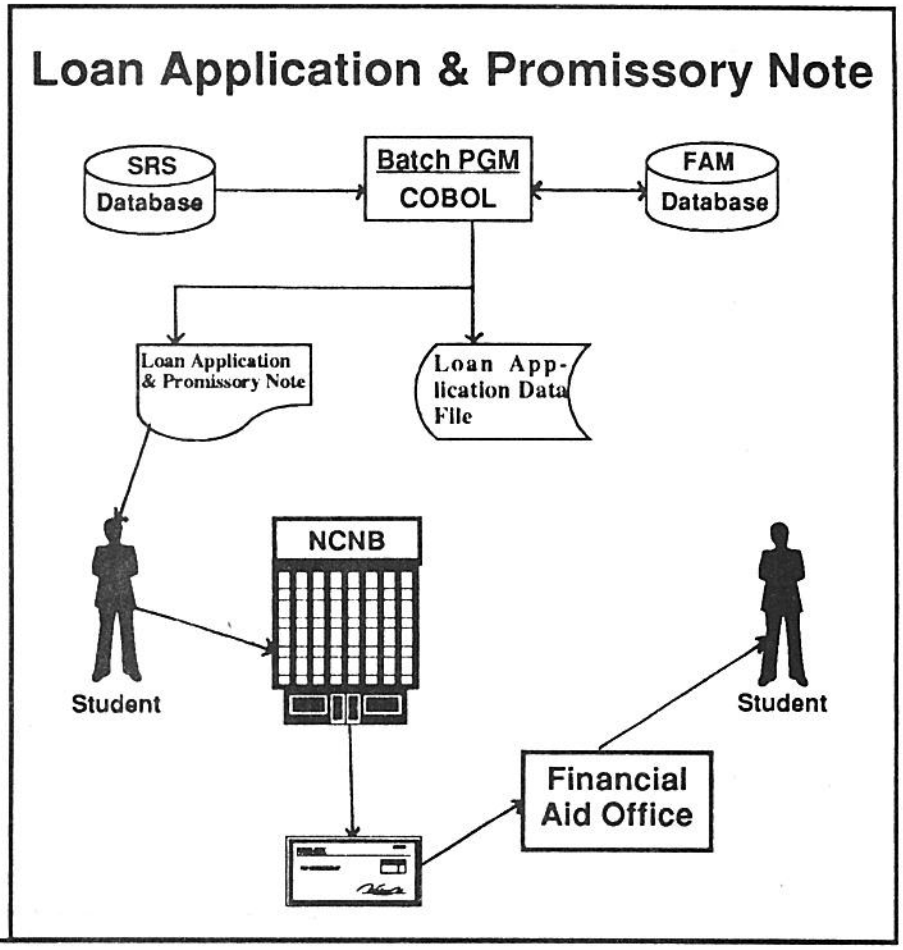
The following article is taken from a presentation made by Mahshid Grooms and Carolyn Cunningham, Director of Financial Aid, at the IAs of Texas Conference October 14, 1990. IAs of Texas is a conference of the clients of Information Associates from whom the University purchased the Financial Aid Management System (FAMS).

The Financial Aid Office processes loans by determining that the borrower (student) meets all the eligibility requirements. Loans are insured by a state or private agency for the lender such as a bank, credit union or savings and loan association. Texas Guaranteed Student Loan Corporation (TGSLC) is a Guarantor and insures the loan for the lenders.

According to the reports generated for federal year 89/90, the Financial Aid office has paid approximately 5,000 students in Stafford, Supplemental, and Parent loans in amount of $13,000,000. They have one full time employee to process all loans and according to the loan coordinator, it took seven minutes to process one application manually. To process an application, the Loan Coordinator had to look up student information from the Student Records database and collect other students data from Financial Aid database. The students' loan information was updated real time to Financial Aid database. The Loan Coordinator then would use the information to type the loan application. The Financial Aid office needed a faster way to process loan applications. Texas Guaranteed Student Loan Corporation (TGSLC) has a system in place called "LINC" (Loan Information Network Clearinghouse). LINC is a PC based software package. LINC can offer to Financial Aid and their students a way to transmit loan applications via a modem and a phone line (electronically) to TGSLC provided the students have supplied to Financial Aid a lender code of their choice and the lender also has installed the LINC software package at their site. After the transmission of the data, TGSLC would process and send back to the school and the lender guaranteed or denial information. LINC also offers printing of the loan applications. To fully automate the loan application processing, we designed and implemented a sub-system to process each loan by retrieving data from the Students Records and Financial aid database. In batch mode, the program updates the student loan data back to the Financial Aid database and captures loan application data into a file on the mainframe computer to be downloaded and transferred to the LINC database on the PC. This process went into production some time in August and according to the Loan Coordinator, it saved six minutes processing time on each loan application.

After evaluating the Loan Application Processing, we realized that we have automated the processing for only part of the students. The Loan Coordinator was processing Loan Applications manually for those students whose lender has not installed LINC or who had not provided a lender code.

We are in the process of modifying the program to process students who have



applied for loans regardless of lender code. The program is being modified to print loan applications. If we have a valid lender code on file, the loan application data will be captured in a file that is then downloaded and transmitted electronically to TGSLC.

The Financial Aid Office is also in the process of changing their procedure and their instructions with this new process. Automation of the Loan Application processing has cut down the processing time considerably. It should be noted that several days are required for the Application to reach the students by mail, and then for the students to mail the Application to the lender.

The Financial Aid office is understaffed and they are looking for better ways to serve the students. We will explore the possibilities of transferring funds electronically. This will shorten the time even more when disbursing funds to students. ■

BBS continued from page 26.

Shareware Software on Campus

#546 26-SEP-1990 10:00:05.40

Subject : Shareware

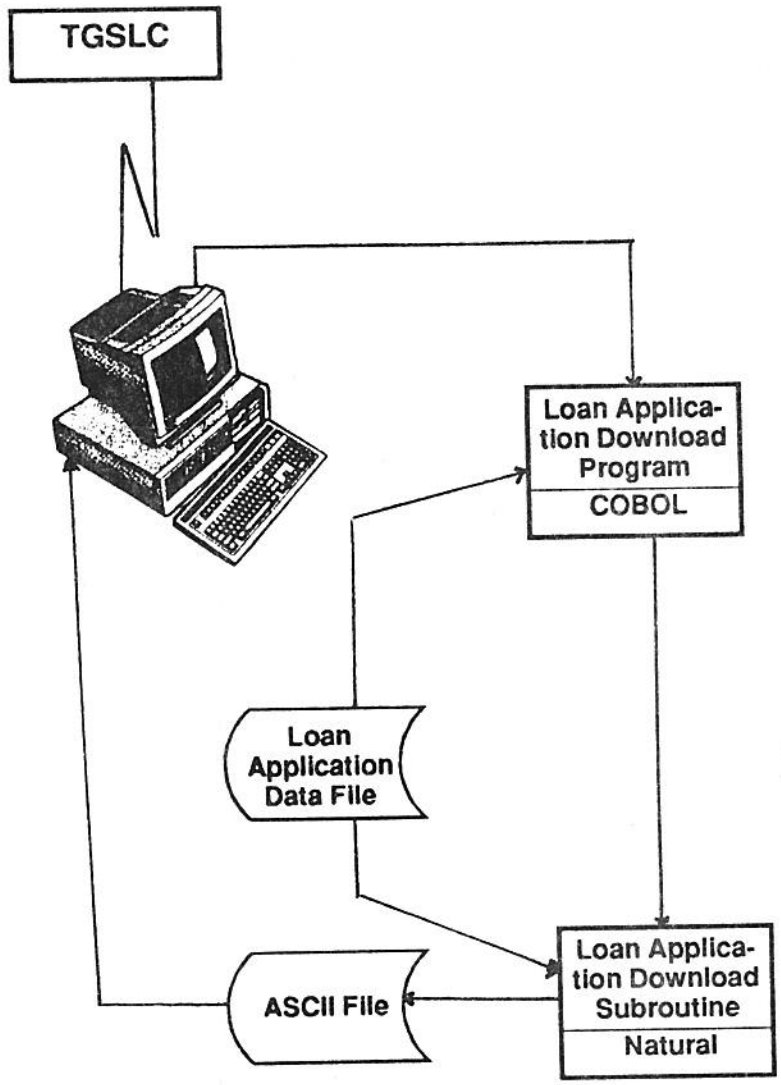
I have read in the all encompassing UNT catalog that there is an "extensive" Shareware library available. The author did not where it was squirreled away. I presume it is in the ISB, but (1) Where and (2) what office hours (important since I take night classes). Any help would be appreciated.

#555 Reply to #546 27-SEP-1990 09:40:40.42

Subject : RE: Shareware

Try the ISB 110 Lab in the Science Library. The shareware is on a CD-ROM which can be accessed from that lab. ■

The Download Process



- Using Natural Connection to Establish a Communication Link Between PC and Mainframe Computer
- LINC Software (TGSLC Product)

Mainframe Performance Statistics

Operating Systems Performance Statistics for September

CPU	SYSTEM	Planned Production Hours	Production Hours Achieved	System Uptime
ACAD	VM/XA2	720.00	698.38	97.0%
ACAD	MUSIC/SP	698.87	675.44	96.6%
ACAD	MVS/JES2	720.00	689.32	95.7%
ACAD	COMPLETA	709.72	677.83	95.6%
ADMN	MVS/JES2	744.00	713.63	99.1%
ADMN	COMPLETA	256.00	252.62	98.7%
ADMN	ADABASA	688.12	680.57	98.9%

- The ACAD CPU achieved 99.6% uptime in September.
- The HDS/7360 DASD achieved 100% uptime in September.
- The HDS/7380 DASD achieved 100% uptime in September.
- The ADMN CPU achieved 99.3% uptime in September.
- The HDS/7360 DASD achieved 100% uptime in September.
- The HDS/7380 DASD achieved 100% uptime in September.
- The EMC Solid State Disk achieved 100% uptime in September.■

Key Causes Of Lost Productivity In September: ACAD CPU

MPU, Tape, and Disk Subsystems (HDS)

1.	Floppy disk reader failures in the console service processor (CSVP).	2.88 HOURS
2.	Replace faulty floppy disk reader in CSVP.	0.62
	TOTAL	3.50 HOURS

Miscellaneous

1.	VM/XA systems software development.	25.77 HOURS
2.	MVSSP system software development.	1.23
3.	Undetermined causes for systems restarts.	0.95
	TOTAL	27.95
	GRAND TOTAL	31.45 HOURS

Key Causes Of Lost Productivity In September: ADMN CPU

MPU, Tape, and Disk Subsystems (HDS)

1.	Failing components in 8083 MPU caused failure of console service processor (CSVP).	2.30 HOURS
1.	Replace failing components in 8083 MPU.	4.57
	TOTAL	6.77 HOURS

Miscellaneous

1.	Undetermined causes for systems restarts	1.66 HOURS
	GRAND TOTAL	8.43 HOURS

ACADemic (HDS) Program Hit Parade

September Top Ten Programs : Frequency Of Runs

Program	Description	#of Runs	% of Total
1. IEBGENER	IBM Utility	11638	14.8
2. ADARUN	ADABAS Utility Module	11442	14.6
3. IEWL	Linkage Editor	10057	12.8
4. PGM=*.DD	Compiled Program	10019	12.7
5. IGYCRCTL	VS COBOL2 Compiler	5181	6.6
6. SASLPA	SAS	4852	6.2
7. IKFCBLOO	VS COBOL Compiler	4220	5.4
8. IEBPTPCH	IBM List Utilitly	4160	5.3
9. IDCAMS	VSAM Utility	2575	3.3
10. ADASQLC	ADABAS SQL Precompiler	2480	3.1

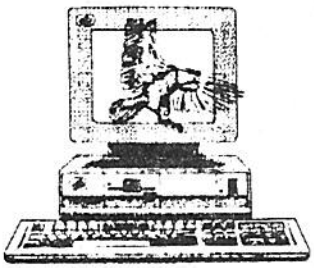
September Top Ten Programs: CPU Seconds Used

Program	Description	CPU Seconds	% of Total
1. SASLPA	SAS	157010	59.8
2. PGM=*.DD	Compiled Program	43153	16.4
3. COMPLET4	Academic COM-PLETE	9774	3.7
4. SPSSX	SPSS-X	8310	3.2
5. ADARUN	ADABAS Utility Module	7849	3.0
6. IGYCRCTL	VS COBOL2 Compiler	7269	2.8
7. SSS4001	Operations Automation	5136	2.0
8. IKFCBLOO	VS COBOL Compiler	4158	1.6
9. SPCHLCOB	COBOL2 Report Writer	2768	1.1
10. IEWL	Linkage Editor	2755	1.0

Disk Backup Schedules

SYSTEM	BACKUP	DESCRIPTION
Administrative MVS/SP	Daily	Monday - Friday around 7 p.m. (after COM-PLETE is shur down) & on Saturday & Sunday if COM-PLETE has been up that day.
	Weekly	Full pack dumps taken each Suncay morning.
	Monthly	Full pack dumps taken on the first day of each month.
Academic MVS/SP	Daily	Monday - Sunday during the early hours of the morning.
	Weekly	Full pack dumps taken each Sunday.
	Monthly	Full volume dumps taken on the first day of each month.
MUSIC/SP	Daily	Wednesday - Monday starting at 4 a.m. and lasting about 30 minutes.
	Weekly	Tuesday mornings at 3 a.m., these last about 2 hours.
	Semester	Once a semester, a permanent backup is taken.
VM/XA	VM Weekly	Early every Wednesday morning.
	CMS mini-disks	Daily backup performed early every morning.Weekly backup every Wednesday starting at 3 a.m..
VAXcluster	Semester	Once a semester, a permanent backup is taken.
	Daily	Incremental backups are peprformed Monday - Thursday at 6 p.m.Saturday & Sunday at 5 p.m.
	Weekly	Full backups are performed every Friday beginning at 8 a.m. generally last all day.
	Monthly	A "stand alone" backup is performed monthly. Dates and times are given in the system log-on message.
	Semester	Once a semester, a permanent backup is taken.

A full description of the system backup procedures can be found by typing **HELP BACKUP** on MUSIC/SP or the VAXcluster.



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